Serving the CoCo Community for
The RAINBOW 11 YEARS
THE COLOR COMPUTER MONTHLY MAGAZINE
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General Information

The Computer Will

As we grow older, many of us write wills as a means of ensuring our intentions are carried out after we pass on. If you have invested a lot in your computer system, you will more than likely want an interested heir to receive and care for your CoCo; a will provides a way of seeing that this happens. But what about a *usage will*?

Items to Address:

- description of the equipment
- how the system is set up
- instructions for powering up
- program loading directions
- location(s) of personal data
- operating hints and tips
- usernames and passwords
- resources and manuals

Some time ago, Lee Denell posted on Delphi a document titled "Color Computer 3 Users Guide/Manual." This article describes how his CoCo is set up, what software he has, and how to use the system. When we saw a copy, we began to think how useful such a guide could be for someone who hasn't used the computer.

Lee starts the guide by giving some background information (history) about the Color Computer. He then describes the physical aspects of the CoCo (the ports, switches, etc.) and how they are used. After the groundwork is laid, Lee explains how to use the various alternate DOSs he has. He closes by naming a support person — someone who can answer questions and solve problems as they arise.

Sprinkled throughout Lee's article are many hints and tips, such as how to set the printer speed and how to load machine-language programs. Also included are explanations of where each piece of equipment is located, how the disks are organized, and where to find his RAINBOW library and software manuals. Most important, Lee includes his Delphi username and tells where his password can be found. After all, nobody else should know these things, and Delphi will continue to bill. It could be vital that certain others know where to find this information.

While such a usage will could be very important when the inevitable happens, its usefulness doesn't end there. Suppose you have an accident and are stuck in the hospital. Your spouse may then need to handle your personal affairs, and the necessary information might be stored on your disks. Or perhaps you are away on an extended business trip. What happens if your teenage child needs to use your computer (for the first time) to write a book report?

We think Lee's idea is excellent. It gives you a way of describing your specific CoCo setup to others who may need or want to use it — a perfect CoCo legacy. We doubt whoever first said "Where there's a will, there's a way" had computers in mind. But it certainly fits.

Tutorial

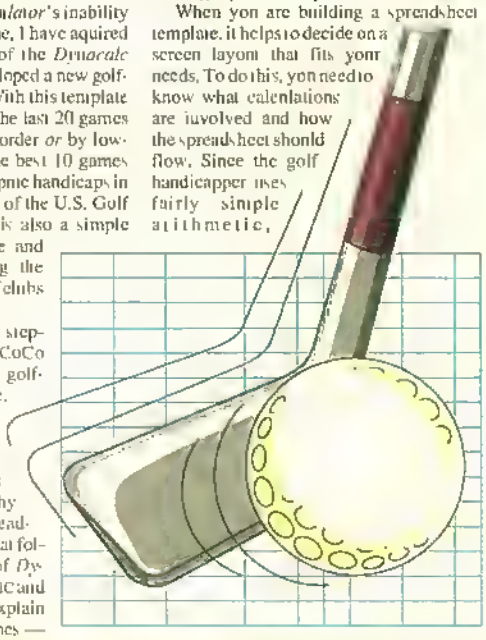
Spreadsheet Gets Things Right on the Course

When I wrote my first article on using a spreadsheet for golf handicapping ("*Spreadculator* Golf Handicapping," *Hot CoCo*, May 1985), I noted that a serious shortcoming was *Spreadculator*'s inability to sort data. Since that time, I have acquired the Disk BASIC version of the *Dynacalc* spreadsheet and have developed a new golf-handicapping template. With this template I can sort my scores, list the last 20 games played (in chronological order *or* by low-high score), determine the best 10 games out of the last 20, and compute handicaps in accordance with the rules of the U.S. Golf Association (USGA). It is also a simple matter to update the file and print the results, making the CoCo a handy tool for golf clubs as well as personal use.

This article describes step-by-step how you can use a CoCo spreadsheet to build a golf-handicapping template. Even though I developed it using *Dynacalc*, the template uses only simple math and functions that should be supported by most Color Computer spreadsheets. The instructions that follow are aimed at users of *Dynacalc* (both the Disk BASIC and OS-9 versions), but I explain what I am doing at all times — with a handy study you should be able to duplicate my work with other spreadsheets. Let's get started.

Setting Up the Template

When you are building a spreadsheet template, it helps to decide on a screen layout that fits your needs. To do this, you need to know what calculations are involved and how the spreadsheet should flow. Since the golf handicapper uses fairly simple arithmetic,



See Spreadsheet on Page 14

Flash

CoCo PRO! Aquires Howard Medical

Ross Linton, president of Howard Medical Company, recently announced that Howard Medical has sold its business to CoCo PRO! The transaction includes inventory, present and future customers and priority products. In a press release dated January 3, 1992, Ross stated, "I have worked with Dave Myers for the last several years and have found his commitment to the Color Computer as well as his ability as a businessman to be unsurpassed." Ross also said, "This hobby . . . has brought me more happiness and fun than I can express."

Support will continue for current owners of Howard Medical products. According to Dave Myers, president of CoCo PRO!, "Existing warranties on Howard Medical products will be honored." In addition, CoCo PRO! intends to pick up production of the Slot Pak and Puppo Keyboard Interface products. Regarding this business move, Dave said, "Howard Medical has provided fantastic service to the CoCo Community, and we are proud that we have the opportunity to continue that tradition."

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Where It All Started

It was 40 years ago (!) this fall that the "Brownell News"— my very first effort at being a publisher — was born. I had found a little "printing press" that my mother bought me. It used rubber letters for type, and as you filled lines of type, you hooked them onto the press and fed the paper through by hand. It wasn't very fancy, but it worked. So Jim Burmeister, my next-door neighbor (actually there was an empty lot next door, and he was next door to that), and I decided we would publish a newspaper.

If you worked at it pretty hard, you could get 10 or 12 lines of type on a single sheet of paper. The paper had to be cut to about 5½ inches wide, so there really wasn't a whole lot of news. But being in the "news business" got us both pretty interested in world events — we followed the Korean Conflict and the political conventions that year, and were unabashedly pro-Eisenhower.

Since the "Brownell News" (the street we lived on in Glendale, Missouri, was Brownell Avenue) managed about 10 lines a week, we did not have pages devoted to specific topics, but we did have lines. Our editorial line was WIN WITH IKE NOVEMBER 6, (this was about all the space we had for a single line). Sports was usually something like CARDS WIN 5-2 BROWNS LOSE 4-0, and it did not matter if the scores were several days old. Jim and I sold about a dozen subscriptions to the "Brownell News" for five cents apiece; each issue was hand-delivered to your door, once a week (usually after a rainy day).

You all are better off than those subscribers were, since we never bothered to specify how long the subscriptions were for. And interest flagged somewhat when we got in trouble for getting ink all over our hands (while taking the letters out of the little metal things so we could reset them for the following week). Besides, Ike won the election.

My father was a staunch supporter of Adlai Stevenson, so the politics were hot and heavy at home that fall. Dad put up a life-sized poster of Stevenson on his bedroom door, but it scared the dog, Spot (who thought a stranger was in the house and barked at it constantly), Mom made him take it down. It wasn't that she didn't like Stevenson — she just couldn't stand the barking.

My political reward was a trip to Washington for Ike's inauguration. My cousin Louis, who lives in Washington, invited me and gave me a marvelous tour of the city for the three days before the inauguration (though he supported Stevenson, too). We went to the parade; I took a million pictures.

When I got home, I gave a presentation about Washington, D.C., for the whole North Glendale School. Bursting with pride, my mom popped for about $50 for a mimeograph machine so it would be easier to put out the "Brownell News." Thus, my publishing career was reborn.

Rose Marion Burmeister and Carl "Sonny" Thorpe were the typists, and the paper usually had six to eight pages. We honored all our subscriptions (and even sold more). Our biggest story was what would be called "investigative reporting" today — we discovered who among the kids in the neighborhood dressed up as a ghost from time to time and scared the little kids.

The most difficult job, of course, was getting Rose Marion and Sonny to do the typing. They were the only people in the neighborhood who could type, so they *had* to do it. We used those old blue stencils you had to "cut" through, then Jim and I would proofread the stencils and try to fix the mistakes.

The "Brownell News" lasted for many issues and, at one point, had a staff of about a dozen kids. I guess the adults thought we were cute. Heck, we even sold an ad — to the Glendale Market — though it probably helped that Mom bought all her groceries there.

I mention all of this because the "Brownell News" was really a huge undertaking, especially for a bunch of kids ranging in age from eight to about 10 (with the exception of Rose Marion and Sonny, who were in Kirkwood High School). Was I born 40 years too soon?

Well, 30, maybe.

Consider that you or your children can duplicate this neighborhood newspaper feat quite easily using your CoCo. *Our* problems were the physical production of the paper; *yours* would be merely to collect the news. You think your CoCo is not worth every penny you've sunk into it? And more!

This is what the Color Computer — or any computer for that matter — is for; it gives you the time to do the creative things without having to take the time for the mechanical aspects. With a CoCo, the "Brownell News" could have been a daily!

* * * * *

I am pleased to report that some of the preliminary comments about our new format are more than generally positive. This pleases us a lot here at THE RAINBOW because we worked very hard to make the new look useful and easy to use for all of you.

We have received a couple of negatives, too. But not very many. And, as I think you will see, we believe our new format will get better as we get more used to doing things with it.

One footnote: I said last month that we would have near a 9 percent increase in editorial space because of the new format. At what was pretty much the last minute — and after that column was written — I decided to make the cover "newspaper-like" rather than like a magazine. That added a whole page of editorial material to your RAINBOW.

And I think it looks nice, too.

— Lonnie Falk

Letters to the RAINBOW

Connecting With the Past

Editor:

I congratulate you for how long you've lasted. I'm an old-timer — I've had a CoCo since December 1982, when I bought a 16K E-board CoCo on sale for $299. Not many magazines have lasted as long as THE RAINBOW. Who remembers *Hot CoCo* or *The Color Computer Magazine*? I sincerely hope you continue for years to come; I've got too much invested in my CoCo to buy anything else.

I need some help. I am trying to contact five people. The first two are Dave Shewchun and Roland Knight. They were contest winners from *The Color Computer Magazine* with a game called *Bugs*. (They also wrote several other programs, including *PenPal*). I recently came across that program, and I need help with it.

The third person I want to locate is Roger S. Young, who wrote a shareware chess-and-checkers program about five years ago. I gave a copy to somebody and they tried to send money to him as requested, but he was no longer at the address given with his program.

The fourth person is author of *Chess-D*. I don't know who he/she is, but I need some help patching the program to work with the Color Computer 3. Finally I'd like to contact the author of *VOX Chess*, but I don't know who wrote it or where he lives.

I don't have a modem, so I can't check for these people on Delphi. Any help would be greatly appreciated.

Carey Bloodworth
1601 N. Hills Boulevard
Van Buren, AR 72956

Software Unification

Editor:

I, like many others, was a CoCo fanatic during the early and middle 1980s. My father owned a CoCo 1, two disk drives and a printer. I bought a CoCo 3 back when it was a deal to get them for $179.95. When I went away to college, my interest waned, and I ended up purchasing an MS-DOS compatible.

What I want to address is the subject Mr. Wilcox addressed in his letter in the December 1991 issue. I am relying on my experience with both the CoCo and MS-DOS worlds. In my opinion it is good that the systems inheriting the title "CoCo IV" run OS-9/68000, and I am glad to see that the producers of these computers are aiming for the CoCo market. I also think software producers in the CoCo market who decide to develop products for one of these machines would do well to set up the software so it works with all the machines. This does not seem too difficult, and in the long run could save the community if it does fracture.

Despite the many different MS-DOS computers with their miscellaneous options, printers and chips, most MS-DOS software runs on most of them. Further, the user can customize a program for his computer simply by running an installation program that asks him what equipment he has. This saves time for the user and is convenient.

I contrast this with my recent experiences playing around with Tandy software for the CoCo 3. Our system is set up for OS-9 Level II and double-sided disks. When I attempted to work with *Multi-Vue*, I had to either copy files one at a time from single-sided disks to double-sided (for which I have no time) or format single-sided disks and attempt to run the program

(which still failed to work). I have given up in frustration. The ability to enter `install` and have the software set itself up would have made life much easier.

I also want to emphasize the importance of hard drives — they are quick, convenient, and of great use. The manufacturers of the System IV, the MM/1 and the Tomcat should take note of this; few users would mind paying a couple extra hundred dollars for a system with a hard drive.

At any rate, I hope I have contributed to the discourse. If the CoCo community is going to survive, a serious approach will have to be taken to making software easy to use for everyone, not just the typical CoCo hacker. And these companies will have to advertise in THE RAINBOW — not just when their system is being reviewed but constantly. They need to make a real effort to sell these systems and keep the software coming.

So I agree with you that there is no one replacement for the CoCo. But at the same time, there must be unification in more than just new options. Good luck.

John Perry III
Marymount University
Box #480
Arlington, VA 22207-4299

We agree. The points you make regarding the installation of application software hold true not only for the newer computers, but for existing CoCos as well.

Picking and Choosing

Editor:

I was interested in your reviews of the new computers offered as a way to go for CoCo users. It's early for judgments, of course, but at first reading the TC9 seems to be the machine for home/hobby users like myself and, perhaps, for a large majority of readers out there. The implication that we may be able to continue to use our precious Color Computer BASIC programs and peripherals on the foreshadowed "virtual machine" is the sort of morale booster we needed — so much so that I have decided to wait and see, and delay going the MS-DOS route (as I was seriously thinking of doing).

I guess THE RAINBOW will eventually be faced with the unenviable task of selecting a running mate for the CoCo. I am sure that you will give due weight to the issue of CoCo compatibility — both software and hardware — before you make a decision.

For us out in the 220/240-volt, 50-hertz belt, the question remains as to whether there will be a version available for us. I'm sure many of us would like to hear from Frank Hogg on this point.

Keiran Kenny
1115 Milson Road
Cremorne, NSW 2090
Australia

THE RAINBOW staff is not in a position to decide for others which of the new computers is the best to have. We can, however, listen to what others have to say and direct our content appropriately. We have received very little mail offering thoughts and opinions from those who have actually purchased one of the new machines. If people are buying the computers, we'd like to hear from them regarding their (dis)satisfaction with their purchases. In any case, we have forwarded your letter to Frank Hogg. Perhaps he can shed some light on the 110- versus 220-volt issue.

Kudos for Rick Cooper

Editor:

I believe that when one of RAINBOW's advertisers provides his customers with service above and beyond the call of duty, he is entitled to public acknowledgment. I recently ordered *All Rick's Software* (Unbelievable Offer #1) from Rick's Computer Enterprise. After receiving the package about a week later, I immediately set out to try all the programs.

I experienced some difficulty with *NIB Compressur*, which is designed to compress graphic displays so they occupy less disk space. With the source files and display programs I was using, the palette colors were always changed when loaded into the compressor. I wrote a letter to Rick Cooper asking if I did something wrong or if there was a fix. Within two weeks I had a response: He was aware of the problem, which stems from the fact that authors use different methods for storing the palette colors. He had previously tried unsuccessfully to solve the problem. After receiving my letter, he took another crack at it and came up with a partial solution. He sent me a fix that worked perfectly with *VUMaster*, a universal public-domain viewing program I use.

Subsequently I ordered Rick's *Treasure Chest* (Unbelievable Offer #3), and it too was shipped promptly. I was surprised to get a personal phone call from Rick a week later asking if I had received my order and if everything was all right. That friendly follow-up was most appreciated. Incidentally, the programs are all enjoyable, colorful and well-done. There is something for everyone.

Norman Barson
7 Ridge Court
East Brunswick, NJ 08816

Looking for Level II

Editor:

I've been trying to locate OS-9 Level II for my CoCo 3 system. Please send me any information on where I can purchase it. Can you also give me information on how to hook up a Nintendo Entertainment System to my CM-8 Color Monitor?

Thanks for all the help you have given me over the years. Before I got THE RAINBOW, I didn't know the vast capabilities of my little CoCo.

Brandon Broyles
4901 Wheeler Drive
The Colony, TX 75056

CoCo PRO! has had several copies of OS-9 Level II in the past. You might call Dave Myers there to see if he can help. Another possible source is Tandy's Express Order line; call (800) 321-3133. We forwarded your question regarding the NES to Marty Goodman.

Ham Hawks

Editor:

I've seen several letters in THE RAINBOW inquiring about the availability of CoCo software for amateur radio. There is a company that has advertised (in *CQ/Ham Radio Magazine*) amateur radio software and hardware for the CoCo. The address is: Dynamic Electronics, Box 896, Hartselle, AL 35640.

Robert Brown
2689 Pimlico Crescent
Gloucester, ON K1T 2A7
Canada

Thanks for the tip, Robert.

A Fast Start

Editor:

I own a Color Computer 3 with 128K of memory, a Radio Shack disk controller and two 80-track 5¼-inch disk drives. I also have a 20-Meg hard drive (an extra Seagate ST-225 hard drive from my MS-DOS computer) and want to know what I need to use this drive with the CoCo. I do not have OS-9 Level II, but I am planning to purchase it when I purchase the 512K upgrade board. Also, where can I get a copy of the manual for the Tandy floppy-drive system? I purchased my disk controller second-hand and it didn't come with a manual.

After getting the system up to par, I plan to write programs for the CoCo. For several years I have written software for other computers and want to expand my work to include this amazing computer. I like programming in assembly language and know several processors already; the 6809 shouldn't be too difficult — my college training included the 6800 series of microprocessors. Could you print a list of the programs and books that you see as the best for a software developer? Or perhaps your readers could suggest something they "can't do without." I would greatly appreciate it. Any reader/programmer who is interested in helping me catch up on the current programming trends and techniques for the CoCo is welcome to write. I will answer all letters.

Matthew Hudson
P.O. Box 287
Doran, VA 24612

To use a hard drive with the CoCo, you'll need a host adapter, controller, cables and device drivers. An excellent choice for the ST-225 drive is the CoCo XT interface from Burke & Burke. For more information, see "A Hard Drive for Your CoCo" (THE RAINBOW, March 1989, Page 44) by Marty Goodman.

At one time several assembly-language books were available for the 6809. Unfortunately these books are out of print and are pretty hard to find. Check your local libraries and used-book stores — two good books to look for are 6809 Assembly Language Programming *by Lance Leventhal and* TRS-80 Color Computer Assembly Language Programming *by William Barden, Jr.*

Thicker Spreads, Anyone?

Editor:

Although my devotion to the CoCo has withstood the test of time, I'm still very frustrated at the lack of some needed power in the spreadsheet arena. I know of no spreadsheet software that makes full use of the 512K in my CoCo 3. Does anybody know of a CoCo spreadsheet program that provides for using more than the usual 30K or so supported by *Dynacalc* and *VIP Calc*? I'd like to be able to save large spreadsheets to DSDD disks, so I need something that supports at least 360K of memory; this would give me a 10-fold increase in utility.

Richard Strong
7514 Belleplaine Drive
Huber Heights, OH 45424-3229

CoCo 2/CoCo 3 Incompatibilities

Editor:

I'm a relatively late comer to the world of the Color Computers — I started with a 16K ECB CoCo II in 1988. After blowing the CPU in that computer, I went to Radio Shack to get repair parts and found the CoCo 3 on sale for $69. I bought it, thinking it would be better than repairing my old CoCo 2. I found out later that *VIP Writer*, *VIP Database* and *VIP Calc* would not work on it. I have since repaired my old CoCo, but it's a pain switching back and forth between the two. Could someone tell me how to remedy this?

I recently purchased two old 4K machines and a box of software from a friend going into the IBM business. (I am getting more and more into the world of CoCo each day.) I expanded the old CoCos and sold them at a bargain price. I also have several CoCo 2 memory chips (8040016) and 64K RAM chips.

I need a pen pal to tell me what to do with all this stuff and also how to get the *Home Publisher* software to work. Any advice or correspondence is welcome.

Terry Stafford
Route One, Box 81-A
Elora, TN 37328

One option is to contact SD Enterprises or Computer Plus to get upgraded copies of their programs. The upgrades support the 40- and 80-column text screens of the CoCo 3. The problem with the earlier versions is that their internal memory tests overwrite some vectors at the top of the CoCo 3's memory. To patch VIP Writer, *use a disk zap program to change the value at offset $6817 from $FF00 to $FE00. Perhaps other readers can offer more patches for the* VIP *series.*

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, 9509 U.S. Hwy 42, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, enter RAI to get to the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, enter LET to reach the LETTERS> prompt, then select Letters for Publication. Be sure to include your complete name and address.

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MV Systems

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The OS9 and Multi-Vue Specialists!

Feature Program

Activities for a Rainy Day

Encouraging young children to learn how to use computers is fast becoming an important step in their education. While some children seem to be "naturals," others may not see much use in learning about computers. By connecting computers with activities children enjoy, we can often overcome this hurdle.

Eensey Weensey Spider is a program that combines graphics with the music for the children's song of the same name. As the CoCo sounds the notes, the words to the tune appear onscreen, further enhancing the educational process.

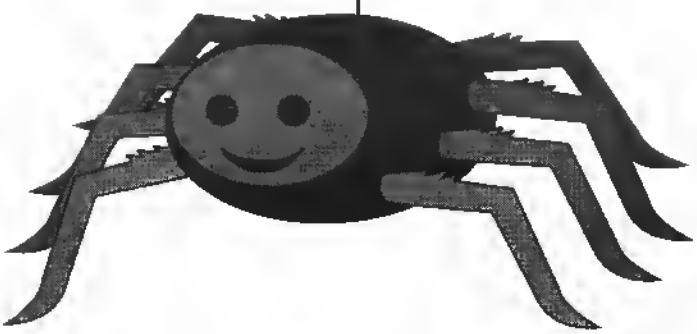
This short program is designed to work on the CoCo 3. Enter the program from the listing, and save it on tape or disk before running it. Now assist your child with running *Eensey Weensey Spider* — and encourage him to sing along with the CoCo.

Ruth E. Golias is retired and likes to write Color Computer programs that children might enjoy. She may be contacted at 2826 Pacific Coast Hwy., Torrance, CA 90505, (310) 325-1384.

CoCo 3

The Listing: EWSPIDER

```
1 'EENSEY WEENSEY SPIDER
2 'BY RUTH GOLIAS
3 '   2826 PACIFIC COAST HWY.
4 '   TORRANCE, CA  90505
5 'COPYRIGHT (C) 1992
6 'BY FALSOFT, INC.
7 'RAINBOW MAGAZINE
10 ON BRK GO TO 970
20 X=RND(-TIMER)
30 HSCREEN2:PALETTE CMP:PALETTE
0,61:PALETTE 8,0:PALETTE 1,32
40 A$="H2U3E2BR2F2D3G2L2;BU7H1U2
EIR2F1D2G1;BL3H2U2E3;BD7BG1L1H3U
4E5;BD11BG2L1H5U5E3;BO148R3L1G4D
3F1;BE7BR3F2R1U1H3;BO3F3D3G1L1;B
L1BU11E4U5H4;BL2BD3F3D4G2"
50 A1$="D126;R2;G44;"
60 HCLS 0
70 HCOLOR 1
80 HLINE(10,101-(310,182),PSET,B
90 PALETTE 2,RND(60)
100 HPAINT(2,2),2,1
110 HCOLOR 1
120 HDRAW"BM197,11;XA1$;"
130 HDRAW"BM193,11;XA1$;"
140 HPAINT(195,12),5,1
150 HDRAW"S8;C8;BM193,145;XA$;"
160 HPAINT(193,136),8,8
170 FOR X=1 TO 8
180 HCOLOR RND(8)
190 HPRINT(9,10),"EENSEY WEENSEY
   SPIDER"
200 FOR D=1 TO 50:NEXT D
210 NEXT X
220 PLAY"T3;V20;O2;L16FGAB-O3L4.
C"
230 FOR D=1 TO 1500:NEXT D
240 FOR X=1 TO 2
250 HCLS 0
260 POKE 65497,0
270 FOR A=9 TO 315 STEP 20
280 SOUND1,1:SOUND100,1
290 PALETTE 8,RND(60)
300 C=15:PALETTE C,RND(60)
310 HCIRCLE(A,11),10,8,.40
320 HCIRCLE(A,182),10,8,.40
330 HPAINT(A,11),C,8
340 HPAINT(A,182),C,8
350 HCIRCLE(A,11),10,8,.60
360 HCIRCLE(A,182),10,8,.60
370 HCIRCLE(A,11),10,8,.70
380 HCIRCLE(A,182),10,8,.70
390 NEXT A
400 POKE 65496,0
410 FOR D=1TO500:NEXT O
420 PALETTE 8,0
430 HCOLOR 8
440 HPRINT(7,4),'THE EEN-SY WEEN
-SY SPIDER"
450 PLAY"T3;V20;O2L8CL4FL8FL4FL8
GL4.AL4A"
460 HPRINT(8,6),"WENT UP THE WAT
ER SPOUT."
470 PIAY"L8AL4GL8FL4GL8AL4FP2L16
FGAB-O3L4CP40"
480 HPRINT(10,8),"DOWN CAME THE
RAIN"
490 PLAY"O2L4,AL4ALBB-O3L2C"
500 HPRINT(7,10),"AND WASHED THE
 SPIDER OUT."
510 PLAY"L8CO2L4B-L8AL4B-O3L8CO2
L4AP2O3L16CD2B-AGL4FP3"
520 HPRINT(11,12),"OUT CAME THE
SUN"
530 PLAY"L4FP8FL8GL2A'
540 HPRINT(7,14),"AND ORIED UP A
LL THE RAIN,"
550 PLAY"L8AL4GL8FL4GL8AL4FP10P3
"
560 HPRINT(7,16),"NOW EEN-SY WEE
N-SY SPIDER"
570 PLAY"L8CL4FL8FL4FL8GL4.AL4A"
580 HPRINT(8,18),'WENT UP THE SP
OUT AGAIN."
590 PLAY"L8AL4GL8FL4GL8AL4FP2O3L
16CC#DEL4F"
600 FOR D=1 TO 1000:NEXT O
610 POKE 65497,0
620 FOR A=309 TO 5 STEP-20
630 SOUND100,1:SOUND1,1
640 PALETTE 8,RND(31)
650 C=15:PALETTE C,RND(15)
660 HCIRCLE(A,11),10,0,.40
670 HCIRCLE(A,182),10,0,.40
680 C=15:PALETIE C,RND(31)
690 HPAINT(A,11),C,0
700 HPAINT(A,182),C,0
710 NEXT A
720 FOR D=1 TO 1000:NEXT O
730 POKE65496,0
740 NEXT X
750 HCLS0
760 HCOLOR 1
770 HLINE(10,101-(310,182),PSET,
B
780 PALETTE 2,RND(60)
790 HPAINI(2,2),2,1
800 HCOLOR 1
810 HDRAW"A0;S4;BM197,11;D117;F5
3;"
820 HDRAW"BM193,11;O117;F53;"
830 HPAINT(195,16),5,1
840 PALETTE 8,0
850 HDRAW"S8;A2;C8;BM197,96;XA$;
"
860 HPAINT(197,108),8,8
870 FOR X=1 TO 8
880 HCOLOR RND(7)
890 HPRINT(3,8),"DOWN THE WATER
SPOUT."
900 FOR D=1 TO 50:NEXT D
910 NEXT X
920 PLAY"T3;L16;O2;8-AGL4F"
930 HCOLOR 8
940 HPRINT(34,21),"REG"
950 HLINE(272,176)-(293,176),PSE
T
960 GOTO960
970 POKE 65496,0:WIDTH32:HSCREEN
0:PALETIE CMP:CLS
```



Product Review

Goodies Disk Two: An OS-9 Potpourri

Goodies Disk Two is a collection of 11 OS-9 programs, most of which are written in BASIC09. One exception is Connect, which is written in assembly language. Documentation for the utilities is included on the disk, and instructions for printing the documentation is included in a readme file.

Connect essentially copies all data from one port to another bidirectionally in much the same fashion as a terminal program. Its purpose, according to the author, is to allow a terminal connected to one serial port to communicate with a modem on another serial port. Connect can also be used to interactively route data between a window and a serial port. A nice advantage of Connect is that it can transfer all 256 ASCII codes (extended characters included) between two devices. The CoCo version exits when you press the mouse button, and an alternate version exits when you press CTRL-X.

ImageCpy copies a 40-track DSDD (double-sided, double-density) disk to a file on your hard drive, and vice versa. This is primarily useful for making multiple copies of a disk with one pass per disk. Since the disk to be copied is read only once, the copy process is much faster.

Label is used to print address labels on standard 1-inch continuous-feed address labels. Up to five lines can be printed on each label.

LogInBD9 is a BASIC09 version of the login command, which is included with the *OS-9 Development System*. LogInBD9 uses the same /dd/sys/password file.

Mail is a spin-off of the VMS mail system found on VAX systems, including Delphi. One primary difference is that Folders, which are similar to directories, are not supported by Mail. However, I doubt many people will ever need to store mail in multiple folders, so this shouldn't be a problem.

MesSel is primarily intended for Delphi users who capture Forum messages using a terminal program. MesSel begins by creating an index file of the messages. It then displays the first message in the file, or the message after the one you read last. This allows you to read new messages in multiple sessions without having to start at the beginning each time. Options available as you read each message include saving the message, printing the message, extracting the message to a separate file, replying to the message, or deleting the message. Once you've finished reading all the messages, MesPre is used to actually carry out the orders you gave to MesSel. MesPre reads and processes the commands stored in the index file created by MesSel.

Selpass is used in conjunction with LogInBD9 to change your password. TSMonBD9 is a BASIC09 version of TSMon, a time-sharing monitor included with the *OS-9 Development System*.

UnFormal converts a formatted ASCII text file to an unformatted ASCII text file. In other words, carriage returns at the end of each line are replaced with a space, and carriage returns at the end of each paragraph are retained. For example, *Dynastar* stores a carriage return at the end of each line while *Ved* stores a carriage return only at the end of the paragraph; UnFormal allows you to easily transfer documents between *Dynastar* and *Ved* without having to manually reformat the document. *(The Warped Drive, 54 Martindale Drive NE, Calgary, AB T3J 2V4, Canada, 403-280-8870; $12 U.S., $14 Can.)*

— Greg Law

"Building a Serial Cable" (Sidebar, March 1992, Page 211: Because of a production oversight, we inadvertently omitted a figure showing how to construct a serial cable for computer/modem connections. While the text should be sufficient, they say a picture is worth a thousand words. The missing figure appears below.

DB25	DIN	Color	Signal
2	4	Green	Transmit Data
3	2	Red	Receive Data
6	1	Yellow	Data Set Ready
7	3	Black	Ground
8	1		Carrier Detect
20	1		Data Terminal Ready

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CER COMP

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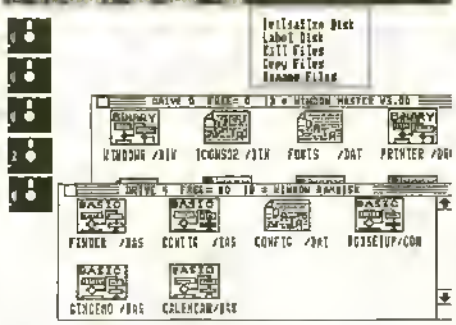

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Product Review

MV Banner: Flair for all Occasions

Using banners adds pizazz to special events — birthdays, homecomings, company parties or farewells — and your message gets across loud and clear. *MV Banner* is an easy-to-use banner-making program. If you have access to a CoCo 3 (256K minimum), OS-9 Level II, *Multi-Vue* and an 80-column monitor, then you have all the required ingredients for *MV Banner* creations.

MV Banner runs in the *Multi-Vue* GShell environment. It features pull-down menus, pop-up windows, editing and saving of banner messages, two fonts, ready-to-use images, an image creator and editor, individually configurable characters, and on-screen viewing of completed banners.

The manual provides instructions for configuring the program for hard-drive use. Unfortunately the instructions for running *MV Banner* from floppy disk are sparse. I seldom use *Multi-Vue* and wasn't sure if my blunderings were stemming from misuse of it or *MV Banner*. I phoned ColorSystems and everything was ironed out in minutes. However, I've come to the conclusion that well-written manuals teach how to use a program; sparse manuals are unclear unless you already *know* how to use the software.

With my questions answered, running *MV Banner* from GShell became easy. After setting the execution directory and printer-port options, clicking on the appropriate drive icon displays file icons. Clicking on the "I Love MV Banner" icon executes *MV Banner*, and clicking on the Welcome screen brings up the editing and banner-viewing screen.

In only a few minutes you can create an attractive banner — and it's easy. There are many options from which to chose: normal, bold, outlined or inverted text (white on black); Computer or Roman fonts; and use of 24 supplied graphics images or the ability to create new ones with the image editor. Combining text and graphics is simple, and the results can be saved to disk. Font support is lacking, but the many text-style options do offer variety.

Character attributes can be set in two different fashions: by default settings or by changes to the current character settings. The easiest way to enter a message is by changing default settings as each letter or image is entered. Current character settings are useful after a message has been completed and slight modifications are needed. At first I was stymied when the current character attributes wouldn't change. Then I discovered there must be an entry in the current character field before you can change its attributes. One other area caused minor dismay: The number keys and their shifted characters aren't printed when using the Roman font.

Printing results vary depending on the printer you use and the modes it supports. *MV Banner* supports normal, double-width, compressed and double-density modes. You can define which characters are used to print the banners. Up to four text characters can be used to obtain a solid graphics block. The printing process is quicker if your printer allows for use of a graphics black character. The manual gives advice on which text combinations or graphics blocks work best.

The maximum field length for a banner is 40 characters and/or images (40 characters handles most banner needs). By printing a banner and entering and printing another — without tearing them apart — any size banner can be created. Three modes are available for viewing banners: normal, compressed and elongated. The bottom half of the screen is used to display and scroll through banners prior to printing — this is a major plus. Imagine printing a 15-foot banner and then realizing the last character is wrong!

The *MV Banner* feature I like most of all is the one for using graphics images. Banners from programs which don't support graphics usually look very plain. The supplied images are good and cover topics ranging from holidays to parties, from baby bottles to graduation caps. Better yet, if you can't find an image to fit the occasion, just create it in the image editor. Created images can be saved to disk.

It is my hope that the manual is presented more clearly in the future. Even so, I still recommend *MV Banner*. Making banners is easy once you get the hang of it! *(ColorSystems, P.O. Box 540, 4616 Castle Hayne, Castle Hayne, NC 28429, 919-675-1706; $22.)*

— Tony Olive

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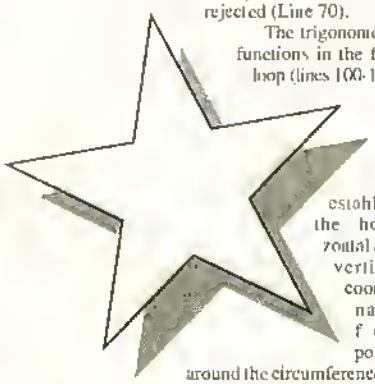
Feature Program

CoCo 3 Sees Stars

Drawing a star with more than five points is pretty difficult — and sketching a respectable five-pointed star is even a challenge. *Varistar* draws perfect multi-pointed stars on the CoCo 3's HSCREEN2.

After you run the program, you are asked for the number of points to use. You may enter any number from 4 to 36 as long as the number you enter is a factor of 360 (there are 360 degrees in a circle). Factors of 360 in this range are 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30 and 36. Any other numbers are rejected (Line 70).



The trigonometry functions in the first loop (lines 100-130) establish the horizontal and vertical coordinates for points around the circumference of an imaginary circle of radius 95. These locations become the points on the finished star. Lines 150 through 190 set a second set of points on a circle of radius 47. Finally the loop from Line 190 to 220 draws lines connecting the points on the two circles.

It isn't necessary to set the points on-screen, but I decided to have *Varistar* do this to help you better understand what is happening. For a more comprehensive discussion on the trigonometry of stars, see "A Perfect Star" (THE RAINBOW, March 1990, Page 92) by Steve Ostrom.

Varistar requires a CoCo 3 and uses the high-speed poke (Line 10). Make sure the computer is at low speed (POKE 65496,0) before saving the program to tape or disk. *Varistar* does this for you if you press BREAK while the program is running (Line 20). Users without RGB monitors should change RGB in Line 260 to CMP.

While drawing stars may seem like a waste of a perfectly good computer, *Varistar* provides a concrete illustration of trig concepts, which is very important for beginning students. Once you dissect the math involved, you can also use the formulas for drawing stars in other programs.

Keiran Kenny's interests lie mainly with the Color Computer's graphics and math capabilities. But in Keiran's own words, "I like to try everything." He may be contacted at 1115 Milson Road, Cremorne, NSW 2090, Australia.

CoCo 3

The Listing: VARISTAR

```
1 'VARISTAR
2 'BY KEIRAN KENNY
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 POKE65497,0
20 ONBRKGOTO260
30 DIMH(95),V(95),X(95),Y(95),P(
47),O(47)
40 PALETTE0,63:PALETTE1,0
50 RD=57.2957/5
60 CLS:INPUT"HOW MANY POINTS (4-
36):";P
70 IFP<4OR360/P<>INT(360/P)OR360
/P<10THEN60
80 PC=360/P
90 HSCREEN2
100 FORZ=0TO360STEPPC:A=Z/RD:C=C
+1
110 H(C)=160+95*COS(A):V(C)=96-9
5*SIN(A)
120 HSET(H(C),V(C))
130 NEXT
140 HY=47
150 FORZ=PC/2TO360-PC/2STEPPC:A=
Z/RD:D=D+1
160 P(D)=160+HY*COS(A):O(D)=96-H
Y*SIN(A)
170 HSET(P(D),O(D))
180 NEXT
190 FORX=1TOP
200 HLINE(H(X),V(X))-(P(X),O(X))
,PSET
210 HLINE-(H(X+1),V(X+1)),PSET
220 NEXT
230 HPRINT(15,12),STR$(P)+" Poin
ts"
240 HPRINT(0,23),"Press any key"
250 EXEC44539:C=0:D=0:WIDTH32:GO
TO60
260 POKE65496,0:RGB:CLS:END
```

Feature Program

EZDASM: Tear Into Memory

Many newer CoCo users are beginning to dabble with assembly language, yet they have had trouble locating an assembler. William Barden, Jr., helped solve this with his *EZASM* program (THE RAINBOW, April and May 1991 issues). To take machine-language programs in the other direction, however, I wrote *EZDASM*. *EZDASM* is an easy-to-use disassembler, a program that produces an assembly-language source-type listing in ASCII format from an assembled machine-language program.

Using a disassembler allows you to see how other programmers write, and gives you many hints and tips for your own programs. Once you gain a bit of experience with machine language, a disassembler helps you alter programs for your own needs. But you don't have to be a programmer to find *EZDASM* a useful addition to your library. Furthermore, *EZDASM*'s system requirements are minimal — it works with 16K Extended BASIC, any TV or monitor, and a disk drive or cassette recorder. The program is designed to work with the 32-column screen.

To get *EZDASM* running, first enter the program shown in Listing 1, then save it and run it. This program builds the machine-language disassembler program from DATA statements. EZDASM checks the data while it runs; if you make any typing errors, the program will let you know. When the program has finished poking data, you are prompted for whether you want the disassembler saved to disk or cassette; press D or C accordingly.

Once the machine-language version has been saved to tape or disk, you can load it and begin to explore other machine-language programs. Before loading EZDASM, however, make sure the binary program you want to examine is already in memory (load it if necessary) and that you know its starting address. Of course you don't have to use *EZDASM* to look at programs only; you can use it to examine the contents of any memory location in the CoCo.

If you are using a disk-based system, EZDASM is saved with a load address of $0000 — you must use an offset to load it into whatever area of memory you want. For example, to load EZDASM starting at $7000, you would enter the following lines:

```
CLEAR 200, &H6999
LOAD "EZDASM", &H7000
```

Make sure you use an offset that will load EZDASM into an area that won't interfere with the program you want to examine.

Once EZDASM is loaded, enter EXEC to start the program. After the title message appears, you are asked for the starting memory address where you want to explore. This is where the disassembly starts. All input to and output from EZDASM is in hexadecimal format, but no radix symbols ($ or &H) are used or required. The disassembler supports the following single-key commands:

Down Arrow — disassemble current address
Up Arrow — set the current address back one byte
A — current address hex byte and ASCII representation
J — jump to a new address
P — printer mode
Q — quit
S — screen only mode.
? — command-key reminder.

If you don't have a printer, be careful not to use the P command: The program will hang, waiting for a printer to come online. If you accidently press P, answer No to the Automatic Mode prompt. Then press S at the > prompt to enter the Screen Only mode.

Learning assembly and machine language can be fun if you have the proper tools. I hope *EZDASM* helps you.

John Collyer has been programming since he got his first Color Computer in 1987. He may be contacted at 3231 Union Street, #6, Medina, OH 44256.

16K Extended

The Listing: EZDASM

```
1 'EZ DISASSEMBLER
2 'BY JOHN COLLYER
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 GOTO 1050
20 CLEAR 50,&H356E
30 CLS
40 LN=1000
50 ST=&H356F
60 P=ST
70 READ LS,C
80 S=0
90 PRINT@0,"WORKING ON LINE";LN
100 FOR X=0 TO 63
110 V=VAL("&H"+MID$(L$,X*2+1,2))
120 POKE P,V
130 S=S+V
140 P=P+1
150 NEXT X
160 IF C<>S THEN PRINT"DATA ERRO
R IN LINE",LN:END
170 LN=LN+1
180 IF P<ST+&HA40 THEN 70
190 CLS
200 PRINT"SAVE TO (D)ISK OR (C)A
SETTE"
210 K$=INKEY$
220 IF K$=""THEN 210
230 IF K$="D"THEN 260
240 IF K$="C"THEN 420
250 GOTO 210
260 CLS
270 PRINT"READY TO SAVE TO DISK"
280 PRINT
290 PRINT"THEN PRESS [ENTER]"
```

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```
300 INPUT E
310 SAVEM"EZDASM",5T,5T+&HA18,0
320 OPEN "R",1,"EZDASM/BIN",1
330 FIELD #1,1 AS B$
340 L5FT B$=CHR$(0)
350 PUT #1,4
360 L5FT B$=CHR$(0)
370 PUT #1,5
380 CLOSE
390 PRINT"THF FZDASM BINARY FILE
 HA5 A    LOAD ADDRE55 OF ZERO"
400 PRINT"YDU HUST ALWAYS USF A
LOAD      DFFSFT WHFN LOADING EZ
DA5M/BIN"
410 FND
420 CL5
430 PRINT"PRES5 [FNTER] WHFN REA
DY TO SAVFTO CASFTTF"
440 INPUT E
450 CLS
460 PRINT"SAVING TO CASFTTE"
470 C5AVEM"EZDASM",5T,5T+&HA18,S
T
480 CLS
490 PRINT"THE BINARY FILE IS SAV
ED        LOAD ADDRESS IS &H356F
-&H3FFF"
500 PRINT"U5E A LOAD OFF5ET TO
          POSITION IN ANY ARFA"
510 PRINT"A LOAD OFF5ET OF &H400
0         WILL PUT IT AT &H756F-
&H7FFF"
520 END
1000 DATA 203800000000000000000000
00FFFFFFFF0000000FFFFFFFF000000
00FFFFFFFF0000000FFFFFFFF000000
00FFFFFFFF0000000FFFFFFFF000017
017A308D08,6551
1001 DATA E9170168C6061701831701
6B308D098F170159338CAC8D02207A30
8CA817015E810827278102723681302 5
F1813923088141 25E9814622F534109F
888C041235,4950
1002 DATA 1022DAA/80AD9FA0022002
34109E888C040F351023C7301FA09FA0
0220BFA780AD9FA0026FC46F41308DEF
5CA6808102071C813923028007C6048D
0220FE6841,6372
1003 DATA 69C4250B5A26F78030AB41
A741393935161 6FF6633BDFF2AI0AEC4
308DFF29863EAD9FA0021700D6810A10
2700E9815E273281412738814A1027FF
4D81502761,6186
1004 DATA 81531027009881511027 01
6F8I3F27022D31702A2308D0880170 0
901700A617009520B313F1F20170405
1600FE1F201704CD1701A8E6A0342034
041704C717,4475
1005 DATA 0196170193358043520C178
240DC1222709C1202505E7801600D2C6
2EE7801600C886FFA78DFFA08D4F308D
08018D308D5481592705BD4016FF5A8D
3B308D0809,5984
1006 DATA 8D2A338DFE7F17FFD186FF
A78DFF778D26338DFF5D308DFF6F10AF
C420398D174FA78DFE62A78DFE5D16FF
28A6802706AD9FA00220F6393414BDA9
2835943414,7859
1007 DATA 8DA181359 4AD9FA00027FA
398F0000301F26FC5A26F6393420ECF4
17042217 00FD3620F6A01F9885801028
04C184F01027008D811010270108B820
1027009281,5839
1008 DATA 30102701E1816010270 0E7
81701027009834043420C40F1700A635
203504C4F0C150270486412002864 2A7
8010AF8DFDD1CC0022ED81308DFDCE30
1FBDB99C6D,6230
1009 DATA 8DFDC42B0316FE8CB6FF97
6F308DFD88301FBD899C4F976F6D8DFD
AA2B0316FF7333BDFD9DECC410A38DFD
98250316FE63308DED9310AEC416FF5C
35B67EA027,8290
1010 DATA 3420BD3C8D528D5B3520F6
A0170377209 88D088D43E6A01D160139
3420318D05558604 8D284A17032D3520
39C40F3420BDBF8D248D323520FCA117
034316FF6C,5151
1011 DATA 318D04F286048D054A1703
0A39E1A4270431A620F8312139CC2020
ED81398620A78039863CA78039863EA7
8039862DA78039C40F342080C88DDF35
20E6A01701,6285
1012 DATA BD16FF28342 0C1101027 03
13C11210250375276 8CII3276FC1I910
2500A52772C11D1025008727758605C1
1F2726318D03DD1702A13520F6A03420
3404C4E054,5095
1013 DATA 5454548D15862CA7803504
C40F8D0B352016FFD8318D038C20D81F
12308D0389E18427043 0320F8E6013A
6D022806F684E7A02004EC84EDA11F21
39318D03C4,6184
1014 DATA 860317025120213 18D038C
8604170246201631 8D0385860317023B
200B318D03AD860317023020 0035216
FE7FC11A260C318D039C8607170 2IC16
FECB318D03,4194
1015 DATA 9720F2C11626193I8D0394
86851702063520ECA13420E3E4170225
352016FE4C318D038020E5342 0C13822
7CC13410250098 1F9854241A318D036E
8D473520E6,5416
1016 DATA A03420318D037886085 48D
1F4A26FA2050318D0357B02D3520E6A0
3420318D034F8608588D054A26FA2036
2503312239340 6ECA14D2B09FD81862C
A780350639,5268
1017 DATA E78020F5340286031701 88
35048D0139C402260986 53A7808620A7
```

```
803986552 0F5352030 1F16FDC4C13C27
12318D032586041 7FE584A17015D3520
16FDAF3180,5610
1018 DATA 030D866017014F16FDFE31
8D0318B6033404170I4135025FB40F34
02F1E427035C20F93410308D03033AA6
843510A78017FFZB3502352 0E6A08D03
16FD6F3404,4927
1019 DATA 5D2819C5102711CAF05017
FF201701361700FF35048D4839C40F20
F158585858102500FA2761280858281 9
582B21206058102700932B2058102B00
8458102B00,4508
1020 DATA 961600F4582B7127685828
701600E9582B57274B1600E158102700
92160 0A83404C460270FC120270FC140
270FC160270F1600C48658200A865920
0686552002,4693
1021 DATA 8653A780350439350 48D0F
8628A7803935048D06CC2828ED813980
758DC1398D70862DA780350420B58D66
CC2D2DED81350420A835042 0E2864120
0686422002,5881
1022 DATA 8644A780350420D2F6A05D
2A045017FD5C8D73350420C3ECA14D2A
0C4353C30001340217FD4735028D5635
0420ACF6A04F1D3420E3F48D488D1731
8D01F58603,6118
1023 DATA 8D14352035043 9ECA13420
F3E48D3120E7862CA78039E6A0F7804A
26F9393504865BA780C19F270AC4EF17
FFD1865DA78039FCA18D0A20F5CC3F3F
ED81350439,7559
1024 DATA 1F898D021F893404C4F054
5454548D043504C40FC1092302CB07CB
30E78039352 0E6A03420C1302510C13F
271D221D3520CC3F3FFD8116F8F3C120
25F2864CA7,6253
1025 DATA 8017FC5717FC9716FD8620
F31F9859282C34041F893I8D010D8606
C40F17FC6D4A17FF72350459280C5910
2BFC188623A78016FC41591028FC3A16
FE3834041F,6085
1026 DATA 89318D01C920D23520E6A0
3420C13F259E220F3180028F860417FF
3A352016F8881F985934041F89318 0BI
AE20AB342034041F98C4F058271A5827
3D3504 1F98,5539
1027 DATA 592B0A318D019E34041F89
208C318D01F520F4818D272831 8D018B
840F810C24D8810327D71F898606 17EB
E14A17FFE68623A78035041 6F88F318D
01C920DC35,6230
1028 DATA 04318D80AB860317FFCC35
2016FB84455847202054465220200 01E
00011C0021A8003180004162005 1480
08130009I1000A0F80080E8044585955
5350434142,3408
1029 DATA 434344504E4F5053594F43
444141534558 4F52434320 2023414F44
```

```
434320234C425241204C425352205055
4C50534B504380558059805844500842
8041434343,4745
1030 DATA 438041804244508058805 9
80555043436741492023395254533A41
4258385254493D4D554C3F5357494C45
4158595355425352 5043520 04E454701
3F3F20023F,4697
1031 DATA 3F2003434F4D044C535205
3E3F2006524F52074153520841534C09
524F4C0A4445430B3F3F200C494F430D
5453540F4A4D500F434C522042524121
42524E2242,3659
1032 DATA 4B4923424C532442485325
424C4F26424F4527424551284256432 9
4256532A42504C28424D492C42474520
424C542F4247542F424C4503434D5044
200C434D50,4093
1033 DATA 59200F4C445920200F5354
5920200F4C445320200F535453202003
434D5055200C434D5053200053554241
2001434D5041200253424341200355 5
4244200441,3470
1034 DATA 4E44412005424954412006
4C4441202007535441202008454F5241
2009414443412 00A4F524120200841 44
4441200C434D5058200D4A535220200E
4C44582020,3382
1035 DATA 0F535458202000535542 42
2001434D5042200205342434220034144
44442004414F44422005424954422006
4C4442202007535442202008454F5242
2009414443,3377
1036 DATA 42200A4F524220200841 44
4442200C4C44442020 0D53544420200E
4C44552020 0F535455202053574933 0D
2020202020202020 20455A4441534D20
2843292031,3255
1037 DATA 3939310D2020202020202020
2020425920 4A4F484E20434E4C4C5945
520D0053544152542041444452455353
3A2000455A444I534D20494E20415554
4F204D4F44,3811
1038 DATA 452028592F4E2920002020
454F442041444452455353 3A2000434F
4D4D414E44204B4559532041524 53A0D
0D312F20444F574F204152524F57204B
4559 0D322E,3778
1039 DATA 2055502041524F57204B
4559 0D332E2041204845590D342F204A
204845590D352E2050204845590D362E
2051204845590D372E2053204845590D
0D2020202 0,3471
1040 DATA 5052455352 0414F59204B
455920544F2052455455524E00000000
00000000000000000000000000000000
00000000000000000000000000000000
0000000000,1633
1050 PMDDF0,1:PCLEARI:GOTO 20
```

Feature Program

Multi-column Directories Get Easier

As with most projects, there is usually more than one way to achieve a goal with a computer. To get the Color Computer to list disk directories in two columns ordinarily requires a bit of programming: The program first has to read the directory track. Then it must sort through the data and display it in a useful format. With the CoCo 3, there is an easy shortcut. Using the 40-column mode and two simple pokes, we can fool the computer into listing directories in two or more columns.

Memory Location 153 ($99) in the CoCo 3 contains the field width for use with the comma separator. The value in this location tells the computer how much space to put between data separated by commas in PRINT-type statements — it works much like tab zones on a typewriter. Normally this value is set to 16, which is half the width of the 32-column screen. Since a disk-directory entry takes up 19 characters plus a carriage return, we'll use POKE 153, 20 to set the field width to 20 spaces, half the width of the 40-column screen.

The carriage return at the end of each directory entry presents another problem — the CoCo will still print only one entry on each screen line. To counteract this, we'll use POKE 47449, 32 (47449 decimal is the same as $B959) to change the carriage return to a space. Now when the computer displays the first entry, it sees the space and moves one position to the right. Then it displays the second entry. After printing the second entry, the computer again prints a space and, because it is at the right edge of the screen, jumps back to the left edge to print the third entry.

Summarizing what we have learned, to see a two-column directory on the CoCo 3, enter the following command line:

```
WIDTH 40: POKE 153, 20: POKE 47
449, 32: DIR
```

The directory listing will appear in two columns. To get back to normal operation, you must immediately change the altered carriage-return character back by poking its original value into location 47449. Do this by entering POKE 47449, 13. It isn't necessary that you change the field width back unless you have another reason to do so.

If you use these pokes with an 80-column screen, the directory listing appears in four columns. This happens because 80 is evenly divisible by 20.

Entering these pokes at the OK prompt every time you want to see a directory listing can be a waste of time and effort. However, using them in a program can really make the CoCo 3 shine. The listing shown here, 5HORTCUT, is a simple launcher for BASIC programs. At the same time, it shows how you can use these pokes in a program.

When you run 5HORTCUT, answer the prompt for which drive. Then you may enter a filename for a BASIC program, which will be executed, or a question mark to see the disk directory. To run the program on an 80-column screen, simply change WIDTH 40 in Line 10 to WIDTH 80.

John A. Coldwell may be contacted at McInnes Island Lightstation, c/o Bag 3670, Prince Rupert, BC V8J 3R1, Canada.

CoCo 3 Disk

The Listing: 5HORTCUT

```
1 'DIRECTORY 5HORTCUT
2 'BY JOHN A. COLDWELL
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 WIDTH 40:CLS
20 CLS
30 PRINT "AN EXAMPLE OF A TWO-CO
LUMN DIRECTORY":PRINT:PRINT:PRIN
T
40 PRINT:PRINT "WHICH DRIVE? ":
50 A$=INKEY$:IF A$="" THEN 50
60 IF A$<"0" OR A$>"3" THEN 10
70 DR=VAL(A$):DRIVE DR:PRINT DR
80 PRINT:PRINT"ENTER AN EIGHT CH
ARACTER BASIC FILENAME OR PRESS
? TO SEE A DIRECTORY";:INPUT FL$
90 IF FL$<>"?" THEN 100
100 POKE 153,20 'CHANGE FIELD WI
DTH
110 POKE 47449,32 'CHANGE ENTER
TO SPACE
120 CLS:PRINT "DRIVE":DR:"DIRECT
ORY:
                              "
:PRINT
130 DIR:POKE 153,16:POKE47449,13
140 PRINT:PRINT:PRINT "FREE GRAN
ULES:";FRE(DR)
150 PRINT:PRINT:PRINT:PRINT "PRE
SS ANY KEY TO CONTINUE ";
160 A$=INKEY$:IF A$="" THEN 160
170 GOTO 10
180 WIDTH 32
190 LOAD FL$,R
```

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Index-Pulse Problems

Q *I have an FD-502 whose drives are good (they work properly with an old FD-500 controller) but whose controller has a formatting problem. Although it reads and writes properly, any attempt to format a disk is met by failure.*

Brian Schubring (THESCHU)
Bloomingdale, Illinois

A Because the index pulse is used only while formatting disks (it is not used when reading or writing sectors on a formatted disk), I suspect your problem is related to the index pulse. The index pulse is carried by Pin 8 of the 34-pin cable between the disk drives and the controller. From Pin 8 on the card-edge connector, it goes to Pin 24 of the 1773 floppy-disk controller chip. Between the connector and the 1173 chip the signal is pulled high via a 4.7K-ohm pull-up resistor, one side of which is the index pulse and the other side of which is +5 volts. Check this part of the circuit very carefully on the disk controller board. Likely as not, you will find this line accidentally grounded (perhaps a solder bridge somewhere) or find the pull-up resistor not properly connected.

Microscience Information

Q *I have a Microscience hard drive but no documentation for its jumpers. I want to add a second hard drive as Drive 1 (second physical hard drive). Do you have any information on Microscience drive-select jumpers?*

Andrew Thibdeau (TIIIB)
Lewiston, Maine

A No, I don't have the specs for Microscience hard drives. However, I do have information on how to set drive selection for almost any ST-506 hard drive. Virtually all ST-506 hard drives come delivered properly jumpered for Drive 0. Keep the drives jumpered this way. If you want to put two drives on the same controller, just make a special cable as follows.

Crimp a 34-pin dual-row connector to one end of a 34-pin ribbon cable. This is the side that will go to your controller. At an appropriate distance for your setup, crimp a 34-pin female edge connector to the cable. This will of course be the connector for the first hard drive. Beyond this point, again at an appropriate distance for your setup, you must customize the end of the cable. Look at the side of the ribbon cable that does not have the red or blue stripe. This is the Pin 34 side. Count five wires from this side, then put a nick in the plastic between the fifth and sixth wires from the Pin 34 end. Count another five wires and put another nick in the plastic. Peel back a few inches of the five-wire segment, starting with the sixth wire from the Pin 34 end and ending with the tenth wire. Put a half twist in this segment. Now reinsert this segment back in the cable, and carefully crimp on another 34-pin connector. What you have done is made a special two-connector cable that has a five-wire segment with a half twist in it. Now hook the second hard drive to this second connector and, of course, hook the 20-pin connector on the drive to the 20-pin connector on your controller board. If all your hard drives are jumpered as Drive 0, this special cable will force the drive connected to the second connector to be Drive 1. Note that this arrangement is similar to the one IBM uses to select drives A and B, though the position and size of the twisted cable in this case is very different. The advantage of this approach is that you never need to know what the jumpers on your hard drive do in order to add Drive 0 and Drive 1.

Backing up Damaged Disks

Q *I have a disk with text files which I cannot back up using the* BACKUP *command. The process just stops at some point with an I/O Error. But I find I can read most of the files on this disk with a word processor. What is going on here? How can I copy this disk?*

Alain Pihon (ALPILON)
Brossard, Quebec
Canada

A It seems that one or more sectors on that disk are damaged, and that these are not the critical sectors containing the directory or file allocation table. So, format another disk, then copy each file from the damaged disk. If you are lucky, you will be able to copy all files to the back-up disk. If that is the case, it means that the damaged sector is one that is not assigned to any of your files. If you are not that lucky, you will likely find that only one file fails to copy (the copy process for that file will fail with an I/O Error). Still, you will likely be able to copy most, if not all, of the files on that disk. After copying all the files you can, do not use the suspect disk. Since one sector went bad, it is possible the media itself is defective. Disks are cheap enough that you can probably afford to discard the suspect disk and start with fresh disks after copying all files you can. If the file you can't copy is critical, a disk zapper and knowledge of Disk BASIC file structure will likely allow you to save most of the damaged file. Cer-Comp produces an excellent set of utilities called *CoCo Tools* that can help you with this and other disk-related problems.

Using SIMMs for Memory Upgrades

Q *Given the low price on 256K-by-8 and 256K-by-9 SIMMs, might it not make sense to design a 512K board for the CoCo 3 that used them instead of 256K-by-1 DIP chips?*

Bob Williams (BAWILLIAMS)
Cedar Hill, Montana

A It is true that electronically there is nothing to prevent the use of 256K-by-8 or 256K-by-9 SIMMs for a 512K or 1-Meg upgrade board. It is also true that the prices, especially on used SIMMs, is extremely low (in the vicinity of $5 or so per SIMM). Indeed, Frank Hogg's Tomcat uses SIPPs (identical to SIMMs except for using pins instead of an edge connector) for its 512K and 1-Meg memory options. However, there is a substantial development cost in designing a new memory board for the CoCo, involving cost of layout and photo masters. This cost has already been amortized with the older 512K boards that use DIP chips, so they are available very economically at around $25 or so per board with no memory installed. Further, used 256K-by-1 chips are virtually as inexpensive on a per-bit basis as are used SIMM's. I've seen prices of 65 cents and less per chip for 41256-12 chips from surplus chip vendors. Thus, while 256K SIMMs would work, if you look closely, they offer too small a cost advantage over 256K DIP chips to justify the cost in time and money of laying out a different style memory board, especially in the case of the usual 512K boards. If 1- and 2-Meg CoCo upgrades had been more popular, we might well have seen use of 256K SIMMs or SIPPs in order to save physical space, given the number of 256K chips required for those memory upgrades.

Where is Extended BASIC

Q *What are the addresses I need to save Extended Color BASIC to a disk or tape file?*

Mike Nelson (MICHAELJN)
Lancaster, Pennsylvania

A Extended Color BASIC occupies the ROM area from $8000 through $9FFF. Thus, to save Extended Color BASIC to tape, enter `CSAVEM "EXBASIC", &H8000, &H9FFF, &HA027`. (Use SAVEM if you are saving to disk.) Note that the file you create has five bytes at the beginning and five bytes at the end that tell BASIC where to load the file in memory and where to start executing it. In this case I had you specify $A027 as the execution address, which would result in a harmless warm start if execution was attempted. If you transfer this file to another type of computer for manipulation, you'd have to trim the first and last five bytes of the file to get a pure image of the Extended BASIC ROM.

Unghosting for Y Cables

Q *I have a friend who wants to use a Burke and Burke hard-drive interface on a Y cable with a Tandy disk controller. He has already arranged to supply power to the Burke and Burke controller via a separate power supply, but he is having problems because attempts by the Burke and Burke software to talk to the controller in the $FF50 through $FF5F address range result in the Tandy floppy controller being triggered. I understand that a simple modification to the Tandy controller can fix this problem.*

Mike Dalene (MDALENE)
Winsted, Connecticut

A What an odd coincidence. I just finished writing an article for THE RAINBOW that answers your question (March 1992, Page 8). In summary, the problem is that all Radio Shack (and most other) floppy-disk controllers use addresses in the range of $FF40 through $FF4F, but do not fully decode the special *SCS address line. For this reason they also respond in the $FF50 through $FF5F range. This naturally causes problems when used on a Y cable with a Burke and Burke hard-drive system.

The solution consists of ORing the *SCS line with the A4 address line on the disk controller, then sending the result of the logically ORed *SCS and A4 lines to where the *SCS line used to go. This can be accomplished with a 74LS02 chip, which has four two-input OR gates. You use only one of these four gates, so tie the inputs of the unused three gates high, leaving the outputs of the unused gates not connected. As a construction trick, I suggest mounting the 74LS02 chip piggyback on top of another 14-pin TTL logic chip on the disk controller, with its power pins down (supplying power to the chip and mechanically mounting it) and all other pins bent up.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. Out Delphi, Marty is the SIGop of THE RAINBOW's CoCo SIG. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.

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CF83-7, a Controlled Reference Words Set for the *CF83 Forth* System. Requires *CF83 Forth*, also available from BDS Software. *BDS Software, P.O. Box 485, Glenview, IL 60025-0485, (708) 988-1656; $11 for the program and a four-page printed manual, $10 for the program with a manual supplied on disk.*

CoCo Cassette #112, a variety of programs presented monthly for the CoCo 1, 2 and 3. This issue contains *Bowlers' Helper*, which keeps stats for 40 teams with up to six bowlers per team; *Pool Player*, a joystick-driven pool game for one or two players; *Music Man*, a music program; *Guest List*, helps organize your guest list (data can be saved to disk or tape and printed); *Serpent*, a game featuring a hungry snake; *Forward Dice*, a game of luck; *CoCo Tools*, a program to help with repetitive tasks such as viewing directories, copying or formatting disks, killing, copying and renaming files; *Pokfix*, help for those having problems getting their CoCo 3 to work with a modem; *Gnome Quest*, a CoCo 3 graphics adventure; and *Birds*, a Tom Mix machine-language graphics game. *T & D Software, 2490 Miles Standish Drive, Holland, MI 49424, (616) 399-9468; $8.*

Desk Tamer, a point-and-click integrated software package. It includes a text editor, a calculator, a phone book and a filing system. *Desk Tamer* also includes a full-featured scheduling system to keep track of appointments and activities. Requires a 512K CoCo 3, OS-9 Level II, the `windint` module from *Multi-Vue*, the `tmd` module (available with *Desk Tamer*), and the enhanced `gfx2` module (created with the public-domain patch by Kevin Darling and available from information services or MV Systems), a disk drive and a mouse or joystick. *MV Systems, P.O. Box 818, Arvada, CO 80001-0818, (303) 420-7777; $34.95 plus $2.50 S/H U.S., $5 foreign.*

Photon, an arcade/action game for the CoCo 3. Features 62 challenging rooms through which you must maneuver a power tank. You must move to avoid Dupes and Plasma Droids, and rearrange the different shaped building blocks to reach strategically placed transporters. Contains 320-by-200-pixel 16-color animated graphics along with real-time music and sound effects. For one or two players. Requires a CoCo 3 and a disk drive. *Sundog Systems, P.O. Box 766, Manassas, VA 22111, (703) 330-8989; $34.95 plus $2.50 S/H for U.S. or Can., $5 foreign.*

VED/68000, a full-featured text editor for the OS-9/68000 environment. *VED/68000* features automatic buffer sizing and online help, and allows you to modify the environment for just about any OSK machine. It supports full-screen editing, global commands, block functions, macros, print formatting and environment functions. Includes *VSplit*, a utility to break extra large files into smaller segments. Requires OS-9/68000. *Boh van der Pool Software, P.O. Box 57, Wyndel, BC V0B 2N0, Canada, (604) 866-5772; or P.O. Box 355, Porthill, ID 83853-0355; $39.95 plus $3 S/H.*

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Spreadsheet continued from Page 1

which lends itself to a "strictly columns" format, I decided to use a boxed header (like I used in the aforementioned article). Look at Figure 1 to see how the screen should look.

```
[  A  ][ B ][ C ][ D ][ E ][ F ][ G ][ H ][ I ]
    GOLFER  GOLFER  GAME    DATE  COURSE  COURSE  GROSS  DIFF.  BEST
     NAME  NUMBER   NO.          PLAYED  RATING  SCORE          10

[  10 ][ 8 ][ 6 ][ 8 ][ 8 ][ 8 ][ 7 ][ 7 ][ 5 ]
```

Figure 1: Column Widths for Golf Handicapper

Included in Figure 1 are the widths I used for each column. These widths are fairly simple to set. Use the arrow keys to position the cursor in the first column (*Dynacalc* calls this Column A) and type `/AW`. This command is used to alter the width attribute. The prompt `CW?` appears onscreen, asking if you want to change the width of the current column or the entire window. Press C for column and the screen shows `Width is: 9`. The 9 (which stands for Default) is nine spaces. Since 10 spaces is the required width for the first column, Type `10` and press ENTER. Follow a similar procedure for columns B through I; for now, use the column widths I specify — you may later change them to your liking.

Now it is time to enter the column headings. Position the cursor in Cell A2 (Column A, Row 2) and type `GOLFER`, as shown in Figure 1. You can use leading spaces to center the heading. After you type `GOLFER`, don't press ENTER — press the down arrow instead. This is one of *Dynacalc*'s shortcuts; when you have an "open" entry for a cell and you press an arrow key, *Dynacalc* automatically enters the contents into the current cell, then moves in the specified direction. This means you don't have to press ENTER and an arrow key every time. Enter `NAME` into Cell A3 and continue, placing the indicated labels in the appropriate cells.

You can spice up the display a bit, like I did, by adding borders. To do this, I used *Dynacalc*'s replicate feature (though its label-entry mode works well, too). Position the cursor in Cell A1, press the equals sign (=) 10 times, then press ENTER. Type `/R` to initiate the replicate command, and the computer displays `Rep-Source Range?` onscreen. Either press ENTER by itself or type `A1` and press ENTER. The screen now shows `Rep-Source Range? A1...A1 Dest Range?`. Press the period key, then type `I1` and press ENTER. This copies the contents of Cell A1 to all cells from A1 to I1. Move to Row 4 and repeat the procedure.

At this point, it is a good idea to save your works so far. Type `/SS` and Dynacalc prompts with `FILE?`. We'll use the filename `FORMAT`; just type this name and press ENTER. If a file with this name already exists, you'll be asked if you want to delete the old file; respond accordingly. To load a previously saved spreadsheet file or template, type `/SL` and press ENTER. Enter the desired filename and press ENTER when prompted.

Before going further, let's take a quick look at how *Dynacalc* (and most other spreadsheets) handles the text and values we enter. There are three types of legal data: label (denoted by L), value (V) and expression (E). A label is pretty much what it says: text used to create a heading or convey some instruction or explanation to the user. Any time you start an entry with an alphabetic or other text character, *Dynacalc* assumes you want to put a *label* in the current cell.

If you press a number key as the first character in an entry, *Dynacalc* assumes you want a numeric *value* (or constant) placed in the current cell. For this reason, you must fool the program if you want to use numbers for creating borders.

To enter a formula or mathematical expression into a cell, you must use a designator as the first character. If the expression involves only simple arithmetic, use the plus sign (+). However, to use a built-in math function, start the expression with an @ sign. When you press ENTER to place an expression into a cell, the results may or may not be calculated and displayed, depending on how you have set up *Dynacalc*. (Is the automatic recalculation mode turned on?) It is important to remember that the displayed contents of any cell that contains an expression are the *result* of that formula, not the expression itself.

O.K., let's continue with our template. Since we want to be able to display our last 20 games onscreen, we need to put the numbers from 1 to 20 in rows 5 through 24 of Column C. (Remember, we used the first four rows for the headings). Move to Cell C5, type 1 and press the down arrow. In Cell C6, type 2 and press the down arrow. Continue this process until you have put the value 20 in Cell C24.

Now let's enter the expression to calculate the differential. Move to Cell H5 and enter `+G5-F5`. This expression subtracts the course rating (Cell F5) from the gross score (Cell G5). Use the replicate command to copy this expression to cells H6 through H24. Keep the cursor on Cell H5 and type `/R`. Now press ENTER or type H5 and press ENTER. When *Dynacalc* asks for the destination, type `H6.H24` and press ENTER. (The period is very important as it separates the first destination cell from the last, defining the range of cells into which you want to copy the expression.) *Dynacalc* next asks whether you want the contents copied exactly (Same) or Relative. Press R for relative; *Dynacalc* will copy the expression and alter the cell addresses involved each time. This keeps you from getting `+G5-F5` in all the cells. In other words, the differential will accurately reflect the data unique to each spreadsheet row.

To get the average differential, first move the cursor to Cell G26 and enter `AVERAGE DIFF:`. Then move the cursor to Cell I26 and enter the formula `@SUM(H5...H14)/10`. This adds the best 10 scores (assuming you sort them first) and divides by the number of scores to get the average. Move to Cell G28 and enter `HANDICAP:`. Now move to Cell I28 and enter the formula `@INT(126*.96)`. This expression, which calculates the actual handicap, instructs *Dy-*

CoCo Spreadsheets

Many electronic spreadsheets have come and gone in this market. However, several are still available. Following is a list of programs you should be able to locate and use with the Color Computer:

DeskMate — an integrated-software package designed for OS-9. The Ledger module is useful for standard row/column manipulations but lacks many functions and features available from other entries. Reviewed April 1986, Page 198, and May 1986, Page 219. Available through Tandy Express Order (1-800-321-3133).

DeskMate 3 — similar to *DeskMate* but designed for OS-9 Level II and the CoCo 3. Supports 40- and 80-column screens. Reviewed December 1987, Page 129. Available through Tandy Express Order (1-800-321-3133).

Disk Spectaculator — useful for many standard row/column manipulations but lacks many functions and features supported by other spreadsheets. Available through Tandy Express Order (1-800-321-3133).

Dynacalc (for OS-9) — a full-featured spreadsheet program that works under OS-9 Level I and Level II. Reviewed November 1985, Page 208. While the Disk BASIC version is no longer available, see its review in the September 1984 issue, Page 219. Available through Tandy Express Order (1-800-321-3133).

Elite Calc — a full-featured spreadsheet program that supports multiple screen widths. Comes on disk or cassette. Reviewed August 1983, Page 262. Available from Elite Software, Box 11224, Pittsburgh, PA 15238, (412) 795-8492.

VIP Calc — a full-featured spreadsheet program. Supports screen widths greater than 32 columns. Also supports embedded printer codes. Reviewed February 1985, Page 222. Also available as part of the VIP Integrated Library. The last address we know for SD Enterprises (the copyright holder) is P.O. Box 621, Carpinteria, CA 93013. However, we were unable to confirm the availability of this product at press time.

VIP Calc III — same as *VIP Calc* except supports the CoCo 3 40- and 80-column screens. Reviewed July 1989, Page 116. The last address we know for SD Enterprises (the copyright holder) is P.O. Box 621, Carpinteria, CA 93013. However, we were unable to confirm the availability of this product at press time.

Some of these products are carried by several vendors. If you have trouble locating one of them, check the ads in THE RAINBOW. Two likely distributors of these products are CoCo PROI and Computer Plus.

THE RAINBOW As a Resource

The electronic spreadsheet is one of the most powerful tools ever developed for computer applications. Using one allows us to quickly manipulate numbers, perform numerous repetitive caluclations and obtain results. Spreadsheets also allow us to ask "what if?" questions, giving us the ability to plan for the future.

Computer texts often define *electronic spreadsheet* using a phrase such as "emulates an accountant's worksheet." While it is true spreadsheets are extremely well-suited for business and financial tasks, their power and versatility potential takes them far beyond the confines of dollars and cents.

Electronic spreadsheets are useful in a wide variety of applications including (but certainly not limited to) statistics, structural analysis, circuit design and sports (the golf handicapper here is but one example). The various engineering disciplines involve many applications where spreadsheets can be used to great advantage. Further, in addition to being ideal for number crunching applications, spreadsheets also make handy databases. Suffice it to say, the utility of spreadsheets is limited only by our own imaginations.

Over the past 11 years, THE RAINBOW has published several articles describing spreadsheets and discussing ways they can be used. Some of the uses are perhaps a little more esoteric than others. But in sparking our inventiveness, all are equally important. Listed below are the most notable entries from the past. Where program listings are indicated, the article includes a listing you can enter to build your own spreadsheet program.

Archer, Dave; "CoCo 3 Number Cruncher;" March 1988, Page 146, program listing.

Ericson, Robert W.; "Building *Spectaculator* Shells;" April 1983, Page 74.

Mitchell, Dennis; "Business Software and the CoCo;" March 1984, Page 28.

Moosallem, Saul; "Spreading It On a Little Thicker;" March 1988, Page 54, program updates to Bill Reed's program (see Reed's entry below).

Posner, Judd C.; "*Spectaculator* Gives Spectacular Statistics;" February 1983, Page 10.

Reed, Bill; "Plottin' and Plannin';" April 1987, Page 184, program listing.

Spencer, Barry; "*MoCalc—Mini-Calc* Gets a Big Brother;" April 1984, Page 186.

Steiner, John; "Using *Elite Calc* to Track Automobile Expenses;" March 1984, Page 178.

Stewart, John; "The Total Figure;" February 1990, Page 26, program listing for Disk BASIC 1.1 and 2.1.

Walters, Francis M.; "Spread a Sheet for Heat Loss;" September 1990, Page 60.

White, Richard; "Bits 'n Bytes of BASIC" and "Accessible Applications;" April 1985 through January 1986. We strongly recommend you read this series of tutorial discussion of Color Computer spreadsheets and their applications.

Dynacalc to multiply the average differential by 96 percent. (The 96 percent is my handicap as defined in the USGA rules.)

We are finished with the template. Save it using a unique name; it can be used for handicapping several individual golfers.

Individual Entries

After loading the template file from disk, you are ready to create the first individual file. Move to Cell D5 and enter the date for the first score for an individual golfer. I use a YYMMDD format for the date (see Figure 2). This makes it much easier should you want to sort by date later.

Now move to Cell E5 and enter the initials for the course played. As shown in Figure 2 I used QH for Quail Hollow — use whatever initials you use for the courses played. Move to Cell F5 and enter the course rating as designated by the USGA. This column is right-justified. (Unless you specify using the format command, all cells containing numeric data are right-justified.) Next enter the score for that game into Cell G5. When you enter the gross scores for any golfer, you must omit any values not allowed under USGA rules. For example, a Golfer with a 20 Handicap is allowed *no more than two* triple-bogies.

Continue entering data until you have all the games listed for that individual. When you reach 20 games, it is time to sort the spreadsheet so that the 10 best games appear in rows 5 through 14. Type /HA to initiate an ascending sort. When asked for the range, respond by typing G5..G24 (again, the period is important). *Dynacalc* will sort rows 5 through 24 — all cells in each row are moved accordingly. (For various reasons you may decide to sort the spreadsheet on other criteria. However, the average differential and calculated handicap are accurate only as long as the spreadsheet is sorted like this). *Caution: Sorting the rows of the spreadsheet may change the cell addresses used in the formula in Cell I26.* Go to that cell and check the equation. If it no longer specifies cells H5 through H14 (H5...H14), edit it so that it does.

	A	B	C	D	E	F	G	H	I
	GOLFER NAME	GOLFER NUMBER	GAME NO.	DATE	COURSE PLAYED	COURSE RATING	GROSS SCORE	DIFF.	BEST 10
			24	901206	QH	68	86	18	*
			28	901220	QH	68	86	18	*
			34	910111	QH	68	86	18	*
			27	901218	QH	68	88	20	*
			37	910129	QH	68	89	21	*
			40	910207	QH	68	89	21	*
			39	910205	QH	68	90	22	*
5	FILE: <BUD>		25	901211	QH	68	91	23	*
6			29	901223	QH	68	91	23	*
7			42	910119	QH	68	91	23	*
8			43	910221	QH	68	91	23	
9			38	910131	QH	68	92	24	
10			35	910117	QH	68	92	24	
11			30	901227	QH	68	93	25	
12			32	910103	QH	68	93	25	
13			26	901213	QH	68	94	26	
14			31	901230	QH	68	94	26	
15			33	910108	QH	68	94	26	
16			36	910122	QH	68	94	26	
17			41	910214	QH	68	97	29	
18									
19	BUD SABEL	NO. 1					AVERAGE DIFF:		20.7
20									
21							HANDICAP:		19

Figure 2: Working Golf Handicapping Spreadsheet

Finishing Touches and Operating Notes

As you will notice from Figure 2, I decided to put the golfer's name and number in Row 26. As you enter and sort different scores, all cells for the moving rows change places. Using the last row for the name allows it to remain undisturbed since Row 26 is not within the sort range given above. Of course I could enter the name and number on every line, but that would be tedious and unnecessary. If you want to compare scores for different golfers, you might fully use columns A and B.

I use the template to create a different spreadsheet file for each golfer, and each file uses the golfer's name for its filename. As a reminder for working with the printouts, I enter the filename into columns A and B about halfway down, then I save each individual file to disk.

When a golfer plays his 21st game, you need to update his individual file. To do this, load the file from disk, move to whatever row in Column C holds the data for his first game, and enter the new data. (You may notice the game numbers shown in Figure 2 are not 1 to 20; I enter new games with the next higher number, deleting the lowest game number.) Now sort the spreadsheet as indicated above.

For my own edification, I type an asterisk in the first 10 rows (for the 10 best games) of Column I. I haven't figured out a way for *Dynacalc* to do this automatically, so I simply enter the asterisks manually after each time I sort the file.

When you save a worksheet to disk, all cells in the sheet are written to disk, even if they are currently out of sight. In addition, column widths, titles, current cursor location, formats, labels, entry modes and row/column flags are saved. Each of the worksheets you save will take about two grans of disk space; if you are working with a large group of golfers, it might be best to use a separate disk for the worksheet data.

Getting Printed Results

A printout is the ultimate goal for the golf league handicapper, and getting one is a simple process. (Make sure you have saved the sheet on disk before you print it.) To print the spreadsheet, type /P. You are prompted for the range to be printed. Enter A1..I28 and the printer will print hardcopy of all data between cells A1 and I28.

A.J. Sabel is a retired Army colonel who has a bachelor's degree in electrical engineering. He has been an amateur radio operator for over 50 years and operates under the Extra Class license KA4M. He may be contacted at 4948 South Shore Drive, New Port Richey, FL 34652.

Join us...
for the *1st Annual* "last CoCofest"!

Okay...it comes as no big secret that there are fewer folks in the CoCo Community than there used to be. There are fewer active vendors. There is less magazine coverage. But, in spite of the fact that the "big guys" wrote us off to history years ago, **we're still here.** And we will be for as long as we choose to be, for the CoCo Community is a rare and special breed indeed! In celebration of the unique sense of kinship that CoCo/OS9/OSk users share, we invite you to join us for what we'll affectionally call "the 1st Annual Last CoCoFest". If enough of us continue to enjoy the fun and fellowship that sets us apart from many other computer users, there will be a 2nd (and 3rd, and 4th...) annual "last CoCoFest". Only time will tell. But, just in case, we're putting every possible effort into making sure that **this** show is more than just a show...that it is indeed a celebration of the Community.

We won't ask you to come just out of a sense of loyalty to the Community (although, if that's what will motivate you to join us, consider yourself asked!). We'd prefer for you to come prepared to join in the fun, as we plan a non-stop CoCo party! Join us, and meet the "faces behind the names", such as **Marty Goodman, Kevin Darling,** and more. Meet fellow CoCoists that you've corresponded with over time, but never met face-to-face. Enjoy the hospitality of the Glenside CoCo Club. Share and learn at **informative seminars,** hosted by the **best names in the biz.** Get a chance to **win** one of dozens of door prizes, valued at **over $1000.** Take in exhibits of all your favorite soft- and hardware, with live "hands-on" demos and **great show specials** from leading vendors. And, to get things off to a roaring start, join us for the **pre-fest "Party with Marty"** on Friday nite (separate admission required).

There's something to be said for saving the best for last...and that's what we plan to do with "the 1st Annual Last CoCoFest"! So join us in a show of support for the Community, enjoy a weekend of fun, frolic, and fellowship, and make us start worrying about how we can possibly top this show next year...

Tickets for the Chicago CoCoFest are available now at a special presale price of $14 for a one-day pass, or $17 for a two-day pass (prices at door $3 higher). Add $1 handling per order. For ticket ordering using VISA or MC, or for information on hotel accomodations ($52.95+tax per nite incl. full breakfast and cocktail hour), call **(313) 482-8128**, or write **CoCoFest, PO Box 763, Ypsilanti, MI 48197.**

CoCoFest is a division of DNM Enterprises, Inc., a corporation in the state of Michigan.

Program Launcher Helps Users Get Started

Launcher is a BASIC program that displays an onscreen menu of all the BASIC programs on a particular disk. You can select any program that appears on the menu, and *Launcher* will run it for you. The program works on the CoCo 3 and requires Disk BASIC. *Launcher* works only with disks that store no more than 68 files.

When you run the program, it reads the disk and prints the filenames of all BASIC programs (or any files with a .BAS extension) on that disk. The filenames are sorted before they are displayed, making it easy to find a specific program. The first filename in the list is highlighted and will be executed if you press ENTER. Use the right and left arrows, H (for Home) and E (for End) to select other files. To exit from *Launcher* without launching another program, press BREAK.

As stated before, displayed filenames are sorted in ascending order. However, the sort (a simple bubble sort) slows down if there are many filenames to be sorted. The sort process can be bypassed, if you want. You can also increase its speed by using machine language or the BASIC+ REPEAT, UNTIL and SWAP statements (THE RAINBOW, June 1991, Page 32).

I chose to use black and white on a 40-column screen to give the highest contrast and readability on any video device. The PALETTE command in Line 155 defines the background color (black), and the command in Line 160 defines the foreground color (white). You can change the colors assigned to these palettes, but don't change the palette numbers themselves.

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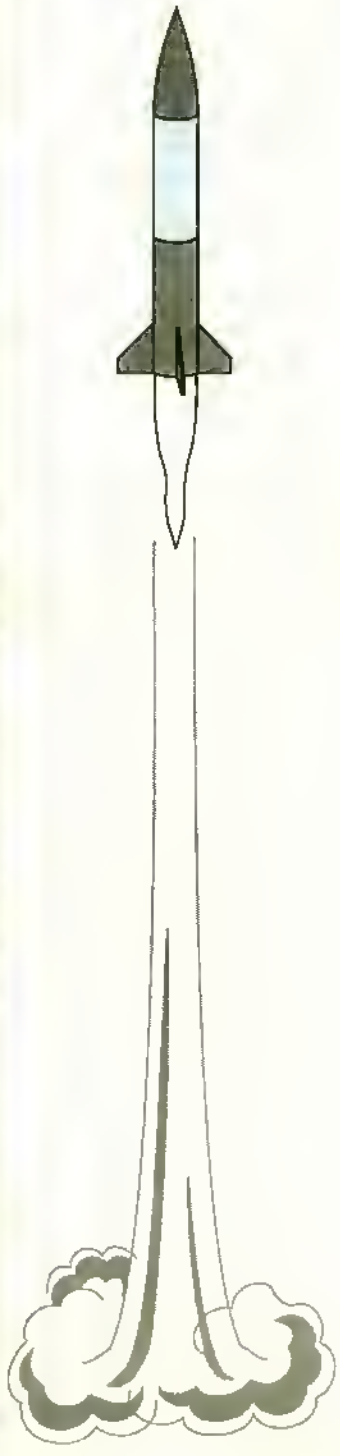


Launcher uses HSCREEN2, the 320-by-192 pixel 16-color graphics screen. In this mode, each byte of video memory holds two pixels (four bits per pixel). Each group of four bits specifies which palette register to use when coloring the pixel.

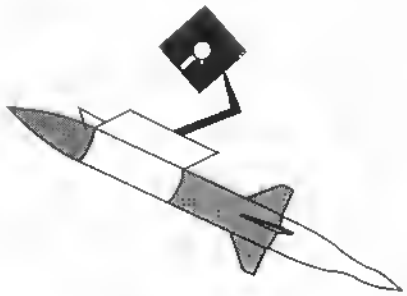
The HGET command in Line 730 reads all the pixels in a rectangle surrounding the current filename (the "selected" filename). The HPUT statement in Line 735 creates the highlight effect. Notice the NOT operator is used to flip each bit; if a pixel is represented by Palette 15 (binary 1111), the NOT operator toggles all the bits to zero, selecting Palette 0 for the HPUT command. If you were to use Palette 1 (instead of 15) for the foreground color, the NOT operator would cause the pixel to represented by Palette 14 (instead of 0). Keep this in mind if you want to use other HSCREENs or palette registers, or if you want to use the highlight effect in another program.

Geoff Friesen has a bachelor of science degree in computer science and mathematics. He is the author of several published articles about computers. He may be contacted at General Delivery, Dauphin, MB R7N 2T3, Canada, (204) 638-7302.

CoCo 3

The Listing: LAUNCHER

```
1 'LAUNCHER
2 'BY GEOFF FRIESEN
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC
5 'RAINBOW MAGAZINE
110 'INITIALIZE
115 '
120 CLEAR 2000
125 DIM BF$(67),SB$(1)
130 LC=1
135 RC=LC+30
140 TR=3
145 ON BRK GOTO 760
150 HBUFF 1,300
155 PALETTE 0,0
160 PALETTE 15,63
165 HCOLOR 15,0
170 HSCREEN 2
175 '
180 'READ BAS FILE NAMES
185 '
190 D=0: N=0
195 FOR S=3 TO 12
200 DSKI$ D,17,S,SB$(0),SB$(1)
205 P=1: SB=0
210 FN$=MID$(SB$(SB),P,11)
215 X$=LEFT$(FN$,1)
220 IF X$=CHR$(0) THEN 250
225 IF X$=CHR$(255) THEN 270
230 X$=MID$(FN$,9,3)
235 IF X$<>"BAS" THEN 250
240 BF$(N)=LEFT$(FN$,8)
245 N=N+1
250 P=P+32
255 IF P>97 THEN P=1: SB=SB+1
260 IF SB<2 THEN 210
265 GOTO 275
270 S=13
275 NEXT S
280 IF N<>0 THEN 315
285 WIDTH 32
290 PRINT "NO AVAILABLE FILES"
295 END
300 '
305 'SPEED UP & SORT FILENAMES
310 '
315 POKE &HFFD9,0
320 IF N=1 THEN 375
325 FOR P=0 TO N-2
330 FOR I=0 TO N-P-2
335 IF BF$(I)<=BF$(I+1) THEN 355
340 T$=BF$(I)
345 BF$(I)=BF$(I+1)
350 BF$(I+1)=T$
355 NEXT I,P
360 '
365 'DRAW SCREEN
370 '
375 HPRINT (16,0),"LAUNCHER"
380 HPRINT (0,23),"ENTER  H"
385 HPRINT (15,23),"ARROW KEYS"
390 HPRINT (32,231,"E  BREAK"
395 HLINE (0,9)-(319,181),PSET,B
400 '
405 'DISPLAY FILENAMES
410 '
415 C=LC: R=TR
420 FOR I=0 TO N-1
425 HPRINT (C,R),BF$(I)
430 C=C+10
435 IF C>RC THEN C=LC: R=R+1
440 NEXT I
445 '
450 'HILITE UPPER/LEFT FILENAME
455 '
460 CF=0
465 GOSUB 710
470 '
475 'MAIN LOOP
480 '
485 K$=INKEY$: IF K$="" THEN 485
490 IF K$=CHR$(8) THEN 535
495 IF K$=CHR$(9) THEN 575
500 IF K$="H" THEN 615
505 IF K$="E" THEN 650
510 IF K$=CHR$(13) THEN 685
515 GOTO 485
520 '
525 'LEFT
530 '
535 GOSUB 710
540 CF=CF-1
545 IF CF<0 THEN CF=N-1
550 GOSUB 710
555 GOTO 485
560 '
565 'RIGHT
570 '
575 GOSUB 710
580 CF=CF+1
585 IF CF=N THEN CF=0
590 GOSUB 710
595 GOTO 485
600 '
605 'HOME
610 '
615 GOSUB 710
620 CF=0
625 GOSUB 710
630 GOTO 485
635 '
640 'END
645 '
650 GOSUB 710
655 CF=N-1
660 GOSUB 710
665 GOTO 485
670 '
675 'ENTER (SLOWDOWN & LAUNCH)
680 '
685 POKE &HFFD8,0
690 LOAD BF$(CF),R
695 '
700 'HILITE/UNHILITE FILENAME
705 '
710 X1=(LC+(CF AND 3)*10)*8
715 X2=X1+7*8+7
720 Y1=(TR+INT(CF/4))*8
725 Y2=Y1+7
730 HGET (X1,Y1)-(X2,Y2),1
735 HPUT (X1,Y1)-(X2,Y2),1,NOT
740 RETURN
745 '
750 'ON BRK DESTINATION
755 '
760 WIDTH 32
765 POKE &HFFD8,0
```



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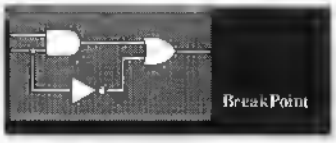


Recover Trashed Text Files

Salvage is a short assembly-language program, written by Stephen Goldberg, that works almost exactly like the standard copy command included with OS-9. The difference between *Salvage* and copy is that copy aborts with an error message if it encounters an unreadable sector where the file is stored on disk. *Salvage*, on the other hand, ignores the bad sector and copies all readable data from the specified file to a new file. This can be very handy for recovering text files (*Salvage* will not recover executable modules), and recovering most of a document is certainly better than having to start from scratch.

The program begins execution at the label `entry` by decrementing the contents of Register B, which contains the length of the parameter string passed on the command line. If no parameters are found, program execution branches to `syntax` to print the command-line syntax of the program, which is

```
salvage <source> <destination>
```

If parameters are entered on the command line, the program clears Register D (`clra` and `clrb`) and stores the result in the variables `hipoint` and `lopoint`. The next step opens the input file for reading and creates the output file for writing. If either file cannot be opened, the program prints an error message and aborts.

The `transfer` loop reads one sector from the input file and writes it to the output file, incrementing `seccount` on each pass through the loop. This loop continues until an error is encountered, in which case the program branches to `error` if it is a read error or to `cont` (to exit the program with the error status stored in Register B) if it is a write error. The `error` routine branches to `cont` if it has reached the end of the input file. Otherwise the current offset stored in `hipoint` and `lopoint` is loaded into registers X and U, the `F$Seek` system call is used to seek beyond the unreadable sector and program execution returns to the `transfer` routine.

Look closely at the variable declarations for `hipoint`, `seccount` and `topoint`, and the beginning of the `transfer` routine. The `F$Seek` system call uses a four-byte offset to indicate the desired position in the file to which to seek. This four-byte offset is stored collectively in these three variables, and Stephen uses a very cute trick to keep track of this offset: At the beginning of the `transfer` routine, the current value of `seccount` is increment by one — but `seconnt` is handled as a 16-bit (two-byte) variable. If you could peek into memory you would see the variables stored somewhat as follows:

```
hipoint     00
seccount    11
topoint     2200
```

In this example, I am assuming that the current offset is $00112200. When `seccount` is loaded via the `ldd` instruction, the value $1122 is retrieved from memory. This retrieves the one-byte value representing `seccount` and the upper byte of `lopoint`. This value is then incremented to $1123 and stored back in `seccount`. The four-byte offset is now represented in memory as:

```
hipoint     00
seccount    11
topoint     2300
```

which represents an offset of $00112300. This trick saves considerable processing time by working with 16-bit, values which can be represented in Register D, rather than working with 32-bit values. To show the difference, the routine could have been written in the longer form as follows:

```
transfer    ldd     lopoint
            add     #256
            std     lopoint
            bcc     xfr
            ldd     hipoint
            addd    #1
            std     hipoint
xfr         leax    buffer,u
```

This routine first loads the initial value of `topoint`, increments it by 256, and then stores the result back in `topoint`. If the carry flag is set (meaning the value overflowed beyond $FFFF), the value of `hipoint` is incremented by one. The drawback to the technique used by Stephen Goldberg is that the maximum file size is limited to $00FFFFFF, or roughly 16 megabytes. However, I doubt many of us have files anywhere near that large, much less a need to copy them from disk to disk.

If you don't have an OS-9 assembler or subscribe to RAINBOW ON DISK, the BASIC09 program in Listing 2 (`MakeSalvage.b09`) can be used to create the executable version of *Salvage*.

In addition to being OS9 Online SIGop, Greg Law enjoys programming on all types of computers and has worked on systems ranging from the CoCo to the Burroughs B6700 super mainframe. He lives in Louisville, Kentucky.

OS-9

Listing 1: `Salvage.asm`

```
00001          ************************************************
00002          *
00003          * SALVAGE  -  (c)1989 by STEPHEN B. GOLDBERG
00004          *
00005          * Retrieves data from defective text files
00006          *
00007                                  ifpl
00008                                  nse   /dd/defs/os9defs
00009                                  endc
00010          *
0001C   0000 87CD0019                 mod   len,name,prgrm+objct,reent+1,entry,dsiz
00012          *
00013 D 0000             tmpath        rmb   1           tmpnl path number
00014 D 0001             outpath       rmb   1           output path number
00015 D 0002             pointer       rmb   1           parameter pointer
00016 D 0003             hipatnt       rmb   1           pasitian pointer ms bytes
00017 D 0004             secconnt      rmb   1           sector count
00018 D 0005             lopoint       rmb   2           positian pointer ls bytes
00019 D 0007             buffer        rmb   256         sector buffer
00020 D 0107                           rmb   200         stack
00021 D 01C1                           rmb   200         parameters
00022 D 0289             dsiz          equ   .
00023   0000 53616C76    name          fcs   /Salvage/
00024   0004 01                        fcb   1           edition number
00025   0005 2863293t                  fcc   /(c)1989 S.B.Goldberg/
00026                  ******************************
00027          * INITIALIZE
00028          ******************************
00029   0029 5A          entry         decb              parameters?
0003C   002A 2755                      beq   syntax      if not, prompt and quit
0003t   002C 4F                        clra
00032   002D 5F                        clrb
00033   002E DD03                      std   hipaint     zero file position pointer
00034   0030 DD05                      std   lopoint
00035   0032 9F02                      stx   pointer     save parameter pointer
00036   0034 8601                      lda   #read.      read mode
00037   0036 103F84                    os9   i$open      open defective file to read
00038   0039 2559                      bcs   cont        message and quit on error
00039   003B 9700                      sta   inpath      save input path number
00040   003D 9F02                      stx   pointer     pointer to next parameter
00041   003F A684                      lda   ,x          next parameter character
00042   0041 8100                      cmpa  #$0d        another parameter?
00043   0043 273C                      beq   syntax      if not, prompt and quit
00044   0045 CC020B                    ldd   #$020b      write mode & attr ----r-wr
00045   0048 103F83                    os9   i$create    create destination file
00046   004B 2547                      bcs   cant        message and quit on error
00047   004D 9701                      sta   outpath     save output path number
00048                  ******************************
00049          * TRANSFER DATA TO NEW FILE
00050          ******************************
00051   0041 DC04        transfer      ldd   seccount    sector count
00052   005t C3000t                    addd  #1          bump to next sector
00053   0054 DD04                      std   secconnt    save it
00054   0056 3047                      leax  buffer,u    sector buffer
00055   0058 t00E0100                  ldy   #256        sector byte count
00056   005C 9600                      lda   inpath      input path number
00057   005t 103189                    os9   i$read      read one sector
00058   0061 2509                      bcs   error       branch on error
00059   0063 9601                      lda   outpath     output path number
00060   0065 10318A                    os9   i$write     write to destination file
0006t   0068 25t0                      bcs   cant         exit with error
00062   006A 2013                      bra   transfer    transfer another sector
00063                  ******************************
00064          * SKIP DEFECTIVE SECTOR
00065          ******************************
00066   006C C1D3        error         cmpb  #a$eof      end of file?
00067   006E 27t6                      beq   naerr       if yes, quit
00068   0070 3440                      pshs  u           save U register
00069   0072 9E03                      ldx   hipoint     get file position pointer
00D7#   0074 DE05                      ldu   lopoint     pointing to next sector
00071   0076 9600                      lda   inpath      input path number
00072   0078 103188                    os9   i$seek      skip defective sector
00073   007# 250A                      bcs   aut         exit with error
00074   007D 3540                      puls  u           retrieve U register
00075   007F 20C1                      bra   transfer    transfer next sector
00076                  ******************************
00077          * ERROR PROMPTS
00078          ******************************
00079   0081 308C28      syntax        leax  <prompt,pcr syntax prompt
00080   0084 8D04                      bsr   print       prompt to screen
0008t   0086 5F          naerr         clrb              clear error
00082   0087 103F06      cant          os9   f$exit      quit
00083          *
00084   009A t00E0064    print         ldy   #t00        maximum prompt length
00085   0081 8601        print1        lda   #1          standard output path
00086   0090 103F8C                    os9   i$writln    prompt to screen
0008/   0093 39                        rts
00088          *
00089   0094 308C3D      cant          leax  <message.pcr can't open file message
00090   0097 10810012                  cmpy  #msglen     message length
00091   0098 8DF1                      bsr   print1      message to screen
00092   009D 9E02                      ldx   pointer     filename pointer
00093   009F A680        cantloop      lda   ,x+         filename character
00094   00At 8120                      cmpa  #$20        end of filename?
00095   00A3 22FA                      bhi   cantloop    no, look some more
00096   00A5 860D                      lda   #$0d        yes, corrupt return
00B97   00A7 A711                      sta   -1,x        to end of filename
00098   00A9 9E02                      ldx   pointer     filename pointer
00099   00AB 8DDD                      bsr   print       filename to screen
00100   00AD 20D8                      bra   exit        exit with error
00101          *
00102   00AF 5573653A    prompt        fcc   /Use: solvage <source> <destination>/
00103   00D2 070D                      fdb   $070d
00t04   00D4 2A2A2A2A    message       fcc   /**** Can't open: /
00105   00t5 07                        fcb   7
00106   00t2             msglen        equ   *-message
00107          *
00108   00t6 011C26                    emod
00109   00E9             len           equ   *
00tt0                                  end
```

Listing 2: `MakeSalvage.b09`

```
PROCEDURE MakeSalvage
0000      (* Generates the binary machine salvage *)
0029      (* Level 1 - change all 7dd to /d0 *1
0041      DIM path,byte:BYTE
0059      DIM connl:INTEGER
006F      PRINT "Creating salvage . . .";
0078      CREATE #path,"7dd/cmds/salvage":WRITE
0096      FOR connl=1 TO 233
00A6        READ byte
00AB        PUT #path,byte
00B5      NEXT connl
00C0      CLOSE #path
00C6      PRINT
00C8      SHELL "attr /dd/cmds/salvage a pe"
00t6      END
00E8      DATA t35,205,0,233,0,t3,t7,t29,t93,0,4t,2,t5t,83,97
0119      DATA 108,118,97,103,229,1,40,99,41,49,57,56,57,32,83
014A      DATA 46,66,46,71,111,109,100,98,101,114,103,90,39,85
0178      DATA 79,95,221,3,221,5,t59,2,t34,1,t6,63,132,37,89
01A9      DATA 151,0,159,2,166,132,t29,13,39,60,204,2,tt,t6,63
01DA      DATA 131,37,71,151,1,220,4,195,0,1,221,4,48,71,16,142
020E      DATA 1,0,150,0,16,63,137,37,9,150,1,16,63,138,37,29
0242      DATA 32,227,t93,21t,39,22,52,64,158,3,222,5,150,0,16
```

```
0273    DATA 63,136,37,10,53,54,32,206,48,140,43,141,4,95,16
02A4    DATA 63,5,15,142,0,100,134,1,16,63,140,57,48,140,61
02D5    DATA 16,142,0,18,141,241,158,2,166,128,129,32,34,250
0303    DATA 134,13,167,31,158,2,141,221,32,216,85,115,101
032E    DATA 58,32,115,97,108,116,46,97,103,101,32,60,115,111
0359    DATA 117,114,99,101,62,32,60,100,101,115,116,105,116,10
0384    DATA 97,116,105,111,110,62,7,13,42,42,42,42,32,67,97
03B5    DATA 110,39,116,32,111,112,101,110,58,32,7,1,236,38
```

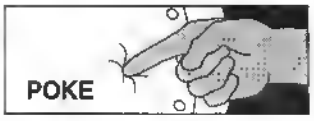
The next phase after entering your latest BASIC creation is that of debugging and editing the program. While BASIC's EDIT command is not the slickest editor ever designed, it's still quite powerful and functional. The EDIT command provides subcommands you can use as you revise each line; to activate a subcommand, simply press the appropriate letter. However, not all the subcommands are documented in the CoCo manual from Tandy. Following are three such commands:

A — cancels all changes made in the line being edited, relists the original line, and lets you continue editing.

Q — cancels all changes made in the line being edited and exits from the EDIT command.

E — keeps all changes and exits from the EDIT command (this is the same as pressing ENTER).

The A and Q subcommands are really helpful if you lose track of what you are doing. You can either abort the current changes and get a fresh look at the original line, or quit the editor altogether.



Many CoCo 3 owners still use TVs for their monitors. Therefore, despite the CoCo 3's enhanced capabilities, these people often use the 32-column screen for their programs. You can dress up those screens using a few simple pokes. To invert the entire screen (green characters on a black background), enter

```
POKE &H95AC,57:POKE &HFF22, PEEK
(&HFF22) OR &H10
```

To activate true lowercase mode on the 32-column screen, enter

```
POKE &H95AC,57:POKE &HFF22, PEEK
(&HEF22) OR &H20
```

These lines can be combined as:

```
POKE &H95AC,57:POKE &HFF22, PEEK
(&HFE22) OR &H30
```

Press SHIFT-0 to toggle between upper- and lowercase characters. Within a program, you can use POKE 282,0 to select lowercase and POKE 282,255 to select uppercase.

Product Review

The Printer Bible: Answers to Your Prayers

The Printer Bible from Que Corporation is designed to answer all your questions about printers. Whether you are planning to purchase a new printer, need to solve problems with a printer you already own, or just want to know how printers work, this book covers most aspects of past and present printer technology.

Written by Scott Foerster, *The Printer Bible* is organized into four major sections: The Basics, Printer Setup and Management, The Publishing Challenge, and Maintenance and Troubleshooting. After giving a brief history of printers, the first section discusses such topics as how text and graphics are printed, the differences between printer fonts and styles, and the hardware and software features available. Hints and tips for getting the most from a printer appear on nearly every page.

The second section covers aspects to consider when making a purchase decision, how to install and test a printer and configuring PC applications for use with printers. Although the book does mention both Macintosh and MS-DOS (naturally) applications, it does not cover CoCo-specific topics.

The third section deals with the particulars of typesetting and the topic of PostScript printers. While much of this section is aimed at users of specific MS-DOS products, a great deal of information is provided on desktop-publishing fundamentals and laser printers. This section is an excellent resource for those who are involved with any form of publishing that involves computers. (Is there any other kind?)

In the last section, *The Printer Bible* provides a step-by-step approach to finding and solving printer problems and includes a complete discussion of serial and parallel interfaces. Most common and some not-so-common problem areas are addressed.

Rounding out *The Printer Bible* are appendices for printer commands (included are Hewlett-Packard, Epson, ISO and DIABLO), a printer vendor list, a font-vendor list and symbol names for many printed characters. Like earlier parts of the book, these appendices are relatively extensive. It is likely most users will spend more time with them than with the rest of the book.

It is obvious *The Printer Bible* is intended mainly for users of Macintosh and MS-DOS computers. However, the information it contains is a gold mine for users of *any* personal computer, and it appears the author has gone to great lengths to ensure this.

Because of the broad spectrum of aspects associated with today's printer technology, this softbound 682-page book doesn't provide individual coverage of specific printers. This might seem a disadvantage to those who want specific details, but that information should come with your individual printer. On the positive side, *The Printer Bible* is written in fairly non-technical terms, making it easy to extend its contents to just about any printer. And it includes an excellent glossary of printing and publishing terms.

The world of printers is often fraught with confusion and misinformation. As a complete resource, I find *The Printer Bible* a welcome addition to my library. *(Que Corporation, 11711 N. College, Carmel, IN 46032, 800-428-5331, ext. ORDR; $24.95, $31.95 Cdn., plus $2.50 S/H.)*

— Cray Angsburg

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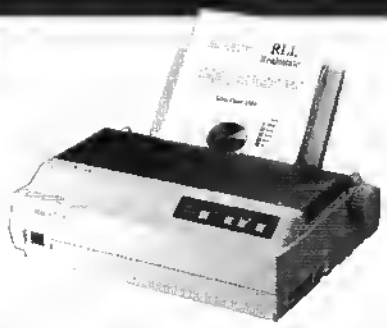

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Feature Program

Patriot Command: Desert Warfare for All CoCos

A cool wind stirs the desert dunes as you and your soldiers settle down for a quiet evening meal. Suddenly the crewman on duty sticks his head out of the Patriot Missile command center and yells "Scuds incoming!"

You run to the command center and quickly scan the radar screen. It looks like the biggest attack so far! You wonder why the Patriots haven't launched yet and discover the Patriot guidance computer has blown a fuse — and there isn't enough time to locate a spare! Knowing you are the last line of defense, you remember your trusty CoCo joystick in your duffel bag, and you quickly wire it into the targeting system. Now it's just you against them. Are you quick enough?

Patriot Command is a machine-language arcade game in which you pit your reflexes against incoming missiles. The program works on any CoCo with at least 16K and Extended BASIC. (Readers with 16K Standard BASIC CoCos can load the executable program from tape as long as the file was created using an Extended BASIC Color Computer.)

To create *Patriot Command*, enter the BASIC program and carefully check it for errors. After you save the program to tape or disk as PDKFCDM.BAS, run it. PDKFCDM.BAS pokes the machine-language code into memory and saves it to tape or disk as PATCOM. The program automatically saves to disk if a disk drive is connected, so make sure you have a formatted disk in Drive 0.

To start *Patriot Command*, first connect a joystick to the *left* joystick port. Then insert the disk or tape that contains PATCOM and enter LOADM "PATCOM":EXEC (tape users enter CLOADM "PATCOM":EXEC). When the title screen appears, press D to see a demo or press any other key to start a game. Pressing S at any time starts a new game; pressing P pauses and unpauses the game. To return to BASIC, press BREAK.

When the game starts, you'll see your allied defenses as bases at the bottom of the screen; the scuds fall from the top. Use the left joystick to position the onscreen crosshairs on an incoming missile, and press the firebutton to launch a Patriot. Remember, it is important to "lead" your targets before firing. CoCo 3 Users Note: For an added challenge, set the computer to high speed (POKE 65497,0) after loading, but before executing, *Patriot Command*.

Bob Kimball is a process-control engineer working in the chemical industry. He is married and has two teenage boys. The Color Computer has been his hobby since 1985. Mr. Kimball may be contacted at #12 Spring Valley, Woodward, OK 73801, (405) 256-3901.

32K Extended

The Listing: PATRIOT

```
1 'PATRIOT COMMAND
2 'BY BOB KIMBALL
3 'COPYRIGH (C) 1992
4 'BY TALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
7 'REQUIRES 32K EXTENDED
8 '*****************************
120 PCLEARB
130 FORX=&H2607 TO &H35BC
140 READ A$:A=VAL("&H"+A$)
150 POKE X,A
160 PRINTX,A:NEXT
170 IF PEEK(188)=14 THEN 180 ELS
E 190
180 CLS:PRINT"READY DISK THEN PR
ESS KEY":EXEC44539:SAVEM"PATCOM.
BIN",&H2607,&H35BC,&H2607:END
190 CLS:PRINT"READY CASSETTE THE
N PRESS KEY":EXEC44539:MOTOR ON:
FORX=0TO2000:CSAVEM"PATCOM",&H26
07,&H358C,&H2607:MOTORDN:FORX=0T
02000:MOTOROFF:END
1000 DATA 10,FF,3F,FF,10,CF,3F,F
C,7F,30,CD,7F,30,A5,7F,30,CC,10,
8E,30,0F,4F,A7,A0,10,8C,30,E5,26
,F8,7F,30,F5,7C,30,F5,10,8F,30,F
A,CC,24,64,ED,A1,C3,0,4,10,83,24
,80,26,F5,17,0,83,10,8F,31,3F,CC
,F,40,F0,A1,C3,0,4
1001 DATA 10,83,F,60,26,F5,86,30
,B7,30,C1,10,8E,31,4F,CC,0,0,ED.
A1,10,8C,31,8F,26,F8,B6,30,BD,B7
,FF,22,B6,30,9F,8F,F,0,A7,80,8C,
25,FF,23,F9,7F,30,C2,7F,30,B3,7F
,30,C8,17,6,40,17,7,65,17,7,FA,4
F,10,8E,32,96,A7,A0
1002 DATA 10,8C,32,B7,26,FB,10,8
E,31,A0,4F,A7,A0,10,8C,31,B0,26,
F8,20,32,7C,30,BF,B6,30,8E,81,8.
26,3,7F,30,BF,7C,30,BF,B6,30,BF,
81,7,26,3,7F,30,BF,BE,30,A8,86,A
A,A1,84,26,F,4F,A7,84,A7,88,F0,A
7,88,C0,A7,88,20,A7,88
1003 DATA 40,10,8F,31,A0,6D,A0,2
7,26,BE,30,B8,30,1,8F,30,88,30,1
,BF,30,8A,CF,A9,5C,11,83,30,8A,2
6,8,CE,A9,0,FF,30,B8,33,41,FF,30
,8A,17,5,85,20,6,10,8C,31,B0,26,
D0,7D,30,D0,26,17,7D,30,83,27,1C
,CC,0,32,FD,30,D5,17
1004 DATA 5,5D,CC,0,CF,FD,30,D5,
16,1,16,7D,30,83,10,26,1,F,16,4,
86,A0,9F,A0,A,8E,F,0,86,1,5D,81,
A,24,2,86,A,C6,3,3D,C1,A0,23,2,C
6,A0,86,20,3D,30,63,F6,1,5C,54,3
0,85,BF,30,A6,BF,30,A8,6D,84,26.
12,86,AA,A7
1005 DATA 84,86,28,A7,88,E0,A7,8
8,C0,A7,88,20,A7,88,40,7D,24,70,
10,77,1,67,7D,30,D0,26,28,86,FF,
0,81,FF,26,5,7F,30,D7,20,7,81,7F
,26,3,7F,30,D7,7D,30,D7,10,26,1,
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,3C,3C,3C,F,F0,F,F0,3C,3C,3C,3C,
F,F0,F,F0,3C,3C,3C,3C,3F,FC,F,FC
,0,3C,3C,3C,F,F0,0,A,1,0,0,1,0,2
,0,3
1049 DATA 3,C0,3,C0,3,C0,3,C0,3F
,FC,3F,FC,3F,FC,3F,FC,3C,0,3F,C0
,3F,C0,3C,0,3C,0,3C,0,3C,3C,3C,3
C,3F,3C,3F,3C,3C,FC,3C,FC,3C,3C,
3C,3C,F,F0,3F,FC,3C,0,3F,C0,F,F0
,0,FC,3F,FC,F,F0,0,A,1,0,0,1,0,2
,0,3
1050 DATA 0,0,F,F,F,C,E,A,F,8,F,
6,E,4,0,0,0,86,1,B7,FF,C8,B7,FF,
C7,B7,FF,C5,B7,FF,C3,4A,87,FF,C0
,B6,30,BD,B7,FF,22,4F,8F,E,0,A7,
80,8C,26,0,26,F9,17,F8,DC,17,FA,
1,CE,35,7C,10,8E,36,60,AE,C4,30,
89,1
1051 DATA 0,BF,35,B4,AE,C1,F6,A4
,86,10,3D,34,20,10,8E,34,40,31,A
B,FC,A1,FD,84,30,88,20,8C,35,B4,
25,F4,35,20,31,21,10,8C,35,7C,26
,D2,8F,0,0,AD,9F,A0,0,81,44,27,1
0,4D,26,9,30,1,27,9,8F,17,90,20,
EC,7F,30,D8,39,7C,30
1052 DATA D0,39,3,C0,F,F0,3C,3C,
3C,3C,3F,FC,3C,3C,3C,3C,3C,3C,3F
,F0,3F,FC,3C,3C,3F,F0,3F,F0,3C,3
C,3F,FC,3F,F0,F,F0,3F,FC,3C,0,3C
,0,3C,0,3C,0,3F,FC,F,F0,3F,F0,3C
,3C,3C,F0,3C,C0,3C,C0,3C,F0,3C,3
C,3C,3C,3C,0,3C,0,3C,0,3C,0,3C,0
,3C,0,3F,FC,3F,FC,30,C,3C,3C,3F,
FC,3F,FC,3C,3C
1054 DATA 3C,3C,3C,3C,3C,3C,3C,3
C,3C,3C,3F,3C,3F,3C,3C,FC,3C,FC,
3C,3C,3C,3C,F,F0,3F,FC,3C,3C,3C,
3C,3C,3C,3C,3C,3F,FC,F,F0,3F,F0,
3F,FC,3C,3C,3F,FC,3F,F0,3C,0,3C,
0,3C,0,3F,F0,3F,FC,3C,3C,3F,FC,3
F,F0,3F,C0,3C,F0,3C,3C
1055 DATA F,F0,3F,FC,3C,0,3F,C0,
F,F0,0,FC,3F,FC,F,F0,3C,3C,3C,3C
,3C,3C,F,F0,3,C0,3,C0,3,C0,3,C0,
3F,FC,3F,FC,3,C0,3,C0,3,C0,3,C0,
3,C0,3,C0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,3C,3C,3C,3C,3C,3C
1056 DATA 3C,3C,3C,3C,3C,3C,F,F0
,3,C0,B,0,F,C,5,A,F,10,2,A,8,8,0
,9,3,8,C,4,D,D,10,0,9,E,10,6,4,E
,17,C1,17,C3,17,C5,17,C7,17,C9,1
7,CB,17,CD,17,CF,17,D1,17,D3,17,
D5,17,D7,17,D9,17,DB,17,DD,1C,43
1057 DATA 1C,45,1C,47,1C,49,1C,4
B,1C,4D,1C,4F,1C,51,1C,53,1C,55,
1C,57,1C,59,1C,5B,0,0,0,1,A,9,11
,D,0
```

Product Review

OS-9 *Variations of Solitaire*

Solitaire has taken over my life! I sit in front of the computer for hours playing one variation after another — usually never winning. Hundreds of hands whirl by on-screen without one hurrah, yet still I play. "Just until I win one, just until I win one" is my mantra. I wasn't this obsessive over solitaire when my parents first taught me to play the simple Klondike variation. I guess shuffling and arranging the cards was too much hassle to stay with it for long. But the computer makes it *so* easy to play solitaire, and I spend hours glued to the computer.

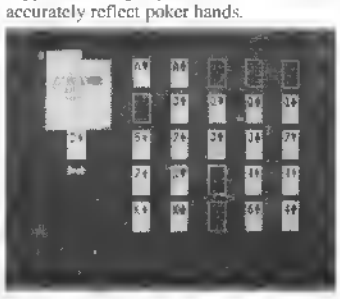
If you decide to add solitaire to your collection of vices, don't overlook ColorSystems' OS-9 *Variations of Solitaire*, which offers five versions of the addicting card game: Klondike, Pyramid, Spider, Poker and Canfield.

Klondike is a familiar friend: It's the one with the seven stacks of cards in the *tableau* (the layout) and the four *foundations* that build from aces to kings in each suit. In Klondike's tableau, you arrange the cards so they descend from high to low in alternating colors (red nine, black eight, red seven, etc.). ColorSystems makes Klondike more challenging by supporting Las Vegas rules — you're advised to pay up when you lose.

Pyramid is a new one to me, and a variation I found particularly addicting. The tableau is laid out in a pyramid fashion, which you must disassemble so that no cards are left in the tableau. Each card is assigned a point value (face value for cards 10 and under, 11 for jacks, 12 for queens, 13 for kings), and you take cards off the tableau in pairs that equal 13 points — a 9 with a 4, for example. If no matches can be made between one card on the tableau and any other, users can look for a possible match from the deck. Two modes are supported: one in which you go through the deck one card at a time (but only one trip through), and one in which the cards are turned three at a time. Kings, being worth 13 points, can be removed all by themselves. The "catch" with Pyramid is that only cards not covered by any in the row below are "available" to be paired: You have to work your way up, and it gets tougher as you go.

Spider deals two decks of cards onto its tableau, which is huge, 10 cards in a row. Like Klondike, a face-up card can be moved to the bottom of a different row providing its value is one lower than the card upon which it is placed. The ultimate goal is to arrange all eight suits from kings to aces and remove them from the tableau. Needless to say, I was not successful in my many attempts.

I could get really hooked on Poker, a variation in which you lay out 25 cards in a matrix of five rows and columns. Each row and column equals a "hand," and you get points for pairs, three-of-a-kinds, straights, etc. Royal flushes, of course, give the most points — 30. A lowly pair yields one point. When playing the English system, straights (12 points) are more valuable than flushes (five points). The American system (also supported) assigns point values that more accurately reflect poker hands.



Like Klondike, in Canfield cards can be moved around the tableau, placed onto another card if it happens to be one lower in rank and of the opposite color of the card it is placed upon. This variation, like the others (except Poker), tracks the number of games won and the number of games lost, as well as a percentage of games won.

Aside from the background color scheme of red and white on black, which I disliked, the game screen is well laid out. The cards look like cards. There's a *Multi-Vue*-like pull-down menu bar across the top of the screen (though *Multi-Vue* is not required). The only menu item on the bar is called Action: Selecting it allows you to read onscreen help and, thankfully, turn off the animation. (Animation can also be turned off with a command-line option when the program is first executed.) The cards animate by default, but they take so much time moving from one side of the screen to another, I was relieved to find a way to stop them. Without animation, the speed of play is decently quick. There is a minor problem of text in the Action menu overwriting other menu options, but it's livable. [*Editor's Note: ColorSystems reports this problem has been fixed.*]

Variations of Solitaire's authors designed the games after researching solitaire variations in the books *Hoyle's Rules of the Games* and *According to Hoyle*. A lot of that research shows up in the manual's informative explanation of rules and game play. You can learn a lot by reading it. But you can also learn to play just by diving in. The Action menu's help screens give you enough information to get started.

To play you'll need OS-9 Level II along with a CoCo 3 having at least 256K of memory. While the keyboard can be used to control play, I recommend a joystick or a mouse. Both RGB and composite modes are supported. (*ColorSystems, P.O. 540, Castle Hayne, NC 28429-0540, 919-675-1706; $34.95.*)

— Lauren Wiltoughby

Feature Program

PRINTING SIDEWAYS Gives Professional Results

Have you ever needed to print text across the length of a piece of paper (maybe you're creating a folded bulletin) but discovered 8½-by-11-inch paper won't fit into the printer sideways? Or perhaps you've just developed a spreadsheet, but it's too wide to fit across one page (and taping two pages together doesn't produce a very professional look — besides, it's a pain).

Sideways is a printer utility that accepts text from a standard ASCII file, rotates it, and prints it sideways down the paper instead of across. As written, *Sideways* requires a CoCo 3 and a disk drive, and it is designed to work with the Radio Shack DMP-120 printer. However, with some minor changes, *Sideways* will work with just about any dot-matrix printer that supports Tandy-mode graphics printing. (Newer Tandy printers that support only "IBM/Epson" codes won't work with the *Sideways* system.)

The reason *Sideways* requires a CoCo 3 is that the program uses the Hi-Res font built into the computer to create the rotated characters. This "limitation" is actually a bonus — the CoCo 3's built-in font can be changed, and you can use different fonts for printing. In fact you can use just about any font created with a font editor such as *Font Creator* (THE RAINBOW, May 1987, Page 99) or *Font Master* (THE RAINBOW, October 1988, Page 41).

Printer Setting	POKE 150,x	
	(Normal Speed)	(High Speed)
600	88	180
1200	41	88
2400	18	41
4800	7	18
9600	1	7
19,200	N/A	1

Figure 1: Printer Rate Values

CHR$(18)	Start graphics mode
CHR$(30)	End graphics mode
CHR$(27);CHR$(19)	Select standard (10 cpi) character
CHR$(27);CHR$(20)	Select condensed (17 cpi) character

Figure 2: *Sideways* Control Codes

With the DMP-120, *Sideways* lets you print in two styles: standard and condensed. The Standard mode allows 47 lines of up to 115 characters each on one page. In the Condensed mode, *Sideways* can handle 79 lines of 115 characters. And if you use fanfold or continuous-roll paper, you can increase the length of the lines up to 255 characters.

Up and Running

The *Sideways* system consists of two programs: SIDEWAYS.BAS (Listing 1) and BITTEST.BIN, a machine-language program that you create by running the BASIC program shown in Listing 2. Enter and save both programs to disk. When entering Listing 1, make sure you use the correct printer speed poke in Line 90. Since the program puts the CoCo in the high-speed mode — effectively doubling the I/O rate — you must use the value that would ordinarily set the computer for half the speed at which your printer is set. For instance, if your printer is set for 9600 baud, use the poke value for 4800 baud. (Standard values are shown in Figure 1. If the value does not work, try increasing or decreasing it by one.) Now run the program in Listing 2; it pokes the object code into memory and saves BITTEST.BIN to disk.

With SIDEWAYS.BAS and BITTEST.BIN on a disk in Drive 0, enter RUN "SIDEWAYS" to start the program. The first prompt that appears onscreen asks "Is this reversed?" If the text is reversed or otherwise garbled, press Y; otherwise press N. Next you are prompted for a filename; enter the name of the file you want to print (any ASCII text file). When you are asked for the number of lines between pages, enter any value or press ENTER to accept the default (five lines). Finally you are asked whether you want standard or condensed printing; press S or C accordingly. During printing, the monitor is blanked to prevent burn-in.

Sideways must be run from a 32-column

Announcing

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Icon Basic09 can also be very useful in studying procedures and programs written by others to learn how they operate. The package contains a full set of icons...or, you may edit or create icons using the included icon editor. Icon Basic09 requires a CoCo-3 with at least 256k, mouse or joystick, and OS-9 lv 2.

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Requires OS-9 L2 for COCO 3, 1.1 for COCO 1 or 2. 2 drives (one can be hard/ramdisk, one floppy 40 T DD DS). Multi-Vue for Multi-Vue version. SDISK3 for COCO3 - SDISK for COCO 1 or 2.

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screen because of the massive amount of string space it needs. Do not change the WIDTH statement to 40 or 80. If you press BREAK to abort the program, however, the string space is deallocated and you can safely use the 40- or 80-column screen. The string space is also deallocated when the program finishes printing and exits.

Restrictions and Modifications

As I stated before, you can use just about any Hi-Res font for printing (you must supply your own fonts). The restriction is that any font you use should not have the left-most bit set in any of the character-forming bytes. The left-most bit (or vertical line in the character) will not be printed. To use an alternate font with *Sideways*, simply load it before running the program.

The above restriction is based on the fact that the Tandy graphics-printing mode supports only seven bits — only seven printer pins are used to print graphics data. The purpose of `BITTEST.BIN` is to flip the order of the first seven bits (to put them in the correct order for printing by Tandy printers) and to reset the left-most (eighth) bit to zero.

The control codes used in the program appear in lines 570, 580 and 860. Their functions are shown in Figure 2. While *Sideways* is designed to work with the DMP-120, you should be able to use it with most older Radio Shack dot-matrix printers without modifying the control codes.

Jeff Hamchuk is a student at the University of Regina and works as a computer operator at the Regina Public Library. He has been a member of the CoCo Community for 11 years.

CoCo 3 Disk

Listing 1: `SIDEWAYS`

```
1 'SIDEWAYS
2 'BY JEFF HAMELUCK
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
7 'FOR THE COCO 3 AND DMP-120
8 '*****************************
80 POKE 65497,0 ' SET PRINTER BA
UD RATE TO 1/2 OF NORMAL
90 POKE 150,86  ' THIS GIVES 120
0 NOT 600 BAUD
100 WIDTH 32 ' MUST BE 32 DUE TO
 CLEAR 40-RES TEXT SCREEN BUG
110 PCLEAR 1
120 CLEAR 21000
130 DIM B$(79)
140 ON BRK GOTO 880
150 PALETTE 1,0
160 HSCREEN 1
170 HPRINT (0,0),"SIDEWAYS  by:
Jeff Hameluck"
180 HPRINT (0,2),"Is this revers
ed? (Y/N)"
190 A$=INKEY$
200 IF A$="" THEN 190
210 IF A$="Y" OR A$="y" THEN 270
220 IF A$<>"N" AND A$<>"n" THEN
190
230 IF PEEK(&HE00)=142 AND PEEK(
&HE01)=240 THEN 290
240 POKE 65496,0
250 LOADM"BITTEST"
260 POKE 65497,0
270 DEFUSR0=&HE00
280 IF A$="Y" OR A$="y" THEN 300
290 A=USR0(0)
300 ON BRK GOTO 870
310 HSCREEN 0
320 FOR X=0 TO 1 STEP .1
330 PRINT TAB(X*1) "SIDEWAYS"
340 NEXT X
350 A$="sideways"
360 FOR Y=0 TO 7
370 PRINT @ 32*Y+9,MID$(A$,Y+1,1
);
380 NEXT Y
390 PRINT @ 256
400 LINEINPUT "FILENAME: ";F$
410 ON ERR GOTO 460 ' I'M ASSUMI
NG THE ONLY ERROR THAT WILL POP
UP HERE
420 POKE 65496,0    ' WILL BE IN
E NE ERROR OR FILE NOT FOUND.
430 OPEN "I",#1,F$
440 POKE 65497,0
450 GOTO 480
460 PRINT " Filename doesn't exi
st!"
470 GOTO 400
480 POKE &HFE0E,0 ' RESETS ON ER
ROR POINTER SO THAT ANY FURTHER
ERRORS
490 POKE &HFE0F,0 ' WILL ABORT E
```


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```
XECUTION OF THE PROGRAM.
500 LINEINPUT "LINE BETWEEN PAGE
S: ";A$
510 IF A$="" THEN LP=5:PRINT @ 3
39,LP
520 LP=VAL(A$)
530 IF LP<1 THEN LP=1
540 PRINT "cONDENSED OR sIAHDARD
: ";
550 A$=INKEY$
560 IF A$="" THEN 550
570 IF A$="C" OR A$="c" THEN PRI
NT #-2,CHR$(30);CHR$(27);CHR$(20
);CHR$(18):W=79:PRINT "C":GOTO 5
90
580 IF A$<>"S" AND A$<>"s" THEN
550 ELSE PRINT #-2,CHR$(27);CHR$
(19);CHR$(18):W=47:PRINT"S"
590 CLS 0
600 LL=0
610 FOR X=0 TO W
620 B$(X)=""
630 NEXT X
640 FOR X=0 TO W
650 POKE 65496,0
660 IF EOF(11 THEN CLOSE#1:D=1:P
OKE 65497,0:GOTO 710
670 LINEINPUT #1,B$(X)
680 POKE 65497,0
690 IF LEN(B$(X))>LL THEN LL=LEH
(B$(X))
700 NEXT X
710 E=W
720 P=1
730 FOR X=E TO 0 STEP -1
740 IF LEN(B$(X))<P THEN PRINT #
-2,STRING$(10,128);:GOTO 820
750 A=ASC(HID$(B$(X),P,1))
760 IF A<33 OR A>122 THEN PRINT
#-2,STRIHG$(10,128);:GOTO 820
770 A=A-33
780 FOR T=7 TO 0 STEP -1
790 PRINT #-2,CHR$(PEEK(61605+A*
8+T)+128);
800 NEXT T
810 PRINT #-2,STRING$(2,128);
820 NEXT X
830 PRINT #-2
840 IF P<>LL THEN P=P+1:GOIO 730
850 IF D<>1 THEN PRINT #-2,STRIH
G$(LP,I31:GOTO 560
860 PRINT #-2,CHR$(30);CHR$(27);
CHR$(191
870 A=USR0(0)
880 POKE 65496,0
890 RGB
900 CLEAR 100
910 UNLOAO
920 END
```

Listing 2: BITTEST

```
1 'BITTEST - FOR SIDEWAYS
2 'BY JEFF HAMELUCK
3 'COPYRIGHI (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
6 '*****************************
7 'RUN TO CREATE BITTEST.BIN FOR
8 'USE WITH SIDEWAYS.BAS
9 '*****************************
90 FOR X=&HE00 TO &HE47
100 READ A$
110 POKE X,VAL("&H"+A$)
120 A=A+VAL(A$)
130 NEXT X
140 IF A<>1798 THEN PRINT "CHECK
SUM ERROR - DATA WRONG!":GOTO 16
0
150 SAVEM "BITTEST/BIN",&HE00,&H
E47,&HE00
160 END
170 DATA BE,F0,A5,5F,B6,01,A4,84
,27,02
180 DATA C8,40,B6,02,A4,84,27,02
,C8,20
190 DATA B6,04,A4,84,27,02,C8,10
,B6,08
200 DATA A4,84,27,02,C8,08,B6,10
,A4,84
210 DATA 27,02,C8,04,B6,20,A4,84
,27,02
220 DATA C8,02,B6,40,A4,84,27,02
,C8,01
230 DATA E7,84,8C,F3,9C,27,04,30
,01,20
240 DATA 8C,39
```

Feature Program

Quick Reflexes Are a Must

Test Your Luck is a two-player game that requires a little patience, fast reflexes and a lot of luck. When it is run, this CoCo 3 program draws 16 blocks around the outside edge of the screen. In each box is a phrase such as You Win $100 or You Lose a Turn, but the phrases don't immediately appear onscreen. The goal is to be the first player whose total winnings meet or exceed $1000, and both players start with an empty bank. Achieving this goal takes some work, though.

One at a time, in random fashion, the phrases are *briefly* flashed onscreen where their associated boxes are located. When a phrase is displayed, any keypress selects that box and the player wins (or loses) accordingly. The flashing "cursor" moves quickly, so you'll have to read fast to catch it with a keypress. (This is where patience comes in handy — once you know where the phrases are located, you can wait for the good ones to light up.)

Player 1 always goes first. You can tell whose turn it is by looking at the numbers next to players' names — the current player's number is highlighted. If a player selects Lose a Turn or Bankrupt, the other player gets a turn. However, while control is transferred, selecting Bankrupt does not cause you to lose a turn. Each player starts with three turns (lives). If you have at least $200 in your bank, you can buy another turn by pressing B. The first person to reach $1000 wins. You also win if your opponent runs out of lives.

One last note: An empty bank (zero dollars) is not the lowest amount you can get. If you drop below zero, you'll have to work your way out of the red, one chunk at a time; the CoCo 3 knows better than to think you could save yourself with a Bankrupt at this point.

Test Your Luck is written for the CoCo 3 and does not require a disk drive. The program does use the high-speed poke (`POKE 65497,0`) — make sure the computer is at normal speed (`POKE 65496,0`) before saving it to tape or disk. I wish you the best of luck with *Test Your Luck*!

John A. Saya is 14 years old and enjoys programming the Color Computer. He may be contacted at 618 N. Townsend Street, Syracuse, NY 13203.

CoCo 3

The Listing: TESTLUCK

```
1 'TEST YOUR LUCK
2 'BY JOHN A. SAYA
3 'COPYRIGHT (C) 1992
```


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These programs require COCO 3 and RGB monitor.

Thanks in advance for helping me continue to support the COCO community with my software and RAINBOW with my ads!

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```
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
40 CLS:LINEINPUT"PLAYER #1 ";AA$
:IF LEN(AA$)>13 THEN SOUND150,2:
GOTO40
50 CLS:LINEINPU1"PLAYER #2 ";B$:
IF LEN(B$I)>13 THEN SOUND150,2:GO
TO50
60 POKE65497,0
70 PALEITE CHP
80 HSCREEN4
90 PALEITE0,32:PALETIEI,63:PALET
TE2,8:PALETTE3,0:HCL5 1
100 HCOLOR0,0:HLINE(0,0I-(639,19
1I,PSET,8
110 HCOLOR0,0:HLINE(96,401-(543,
151I,PSET,B
120 HCOLOR0,0:HLINE(0,0I-(96,40I
,PSET,B
130 HCOLOR0,0:HLINE(96,0I-(192,4
0I,P5ET,B
I40 HCOLOR0,0:HL1NE(192,0I-(288,
40I,P5ET,8
150 HCOLOR0,0:HLINE(288,0I-(384,
40I.PSET.8
160 HCOLOR0,0:HLINE(480,0I-(480,
401,PSET,B
170 HCOLOR0,0:HLINE(480,0I-(543,
40I,P5ET,8
I80 HPAINT(48I,II,2,0
190 HCOLOR0,0:HLINE(543,0I-(639,
40I,PSET,B
200 HCOLOR0,0:HLINE(543,40I-(639
,80I,PSET,B
210 HCOLOR0,0:HLINE(543,80I-(639
,120I,PSET,B
220 HCOLOR0,0:HLINE(543,120I-(63
9,151I,P5ET,B
230 HPAINT(544,121I,2,0
240 HCOLOR0,0:HLINE(543,151)-(63
9,191I,PSET,8
250 HCOLOR0,0:HLINE(447,151I-(54
3,191I,PSET,B
260 HCOLOR0,0:HLINE(351,151I-(44
7,191I,PSET,B
270 HCOLOR3,0:HLINE(255,151I-(35
1,191I,PSET,B
280 HCOLOR0,0:HLINE(159,I51I-(25
5,191I,PSET,B
290 HCOLOR0,0:HL1NE(96,151I-(159
,191I.PSET,8
300 HPAINT(97,1521,2,0
310 HCOLOR0,0:HLINE(0,151)-(96,I
9II,PSET,8
320 HCOLOR0,0:HLINE(0,111I-(96,I
511,PSET,8
330 HCOLOR0,0:HLINE(0,71I-(96,11
11,PSET,B
340 HCOLOR0,0:HLINE(0,40I-(96,71
I,PSET,B
350 HPAINT(1,41I,2,0
360 HPAIRI(97,41I,0,0
370 HCOLOR2,2:HLINE(195,56I-(251
,561,PSEI
380 HCOLOR2,2:HL1NE(223,56I-(223
,801,PSET
390 HCOLOR2.2:HLINE(257.56I-(257
,80I,P5ET
400 HCOLOR2,2:HLINE(257,561-(291
.56I,PSEI
410 HCOLOR2,2:HLINE(257,67I-(280
.67I,PSEI
420 HCOLOR2,2:HL1NE(257,80I-(291
,80I,PSET
430 HCOLOR2,2:HLINE(335,56I-(301
,56I,PSET
440 HCOLOR2,2:HLINE(301,561-(297
,60I,PSET
450 HCOLOR2,2:HLINE(297,60I-(336
,68I,PSET
460 HCOLOR2,2:HL1NE(336,68I-(336
,76I,PSET
470 HCOLOR2,2:HLINE(336,76I-(328
,80I,P5ET
480 HCOLOR2,2:HL1NE(328,801-(303
,80I,PSET
490 HCOLOR2,2:HLINE(346,56I-(404
,56I,PSET
500 HCOLOR2,2:HL1NE(375,56I-(375
,80I,PSET
510 HCOLOR3,3:HPRIN1(34,11I,"Y O
 U R"
520 HCOLOR2,2:HLIUE(I77,102I-(I7
7,126I,PSET
530 HCOLOR2,2:HLINE(177,126I-(21
1,126I,PSE1
540 HCOLOR2,2:HL1NE(223,102I-(22
3,1261,PSE1
550 HCOLOR2,2:HL1NE(261,102I-(26
1,126I,P5ET
560 HCOLOR2,2:HL1NE(223,126)-(26
1,126I,PSET
570 HCOLOR2,2:HLINE(273,102I-(27
3,126I,PSET
580 HCOLOR2,2:HLINE(273,102)-(31
2,I02I,PSET
590 HCOLOR2,2:HLINE(273,126I-(31
1,126I,PSET
600 HCOLOR2,2:HLINE(324,102I-(32
4,126I,PSET
610 HCOLOR2,2:HLINE(365,102)-(32
4,1I4),PSET
620 HCOLOR2,2:HLINE(325,113I-(36
5,126I,PSET
630 HCOLOR3,3:HPRINT(47,15I,". .
 . "
640 U=3:YY=3
650 HCOLOR1,1:HPRINT(32,18I,"8y
John A. Saya":HCOLOR1,1:HPRINT(1
3,18I,"1>":HCOLOR3,3:HPRINT(16,1
81,AA$:HPRIN1(50,18I,"2>":HPRINT
(53,18I,8$
660 HPRINT(I3.61,"$":HPRIN1(14,6
I,Q:HPRINT(54,61,"$":HPRINT(55,6
I,V:HPRINT(I3,7),"TURNS:":HPRINT
(19,7I,U:HPRINT(54,7I,"TURNS:":H
PRINT(60,7I,YY
670 X$="YOU WIN":KK$="$200"
680 L$="YOU LOSE":LL$="$150"
690 M$="YOU GAIN":MM$="A TURN"
700 N$="YOU WIR":NN$="$225"
710 O$="YOU LOSE":OO$="A TURN"
720 P$="YOU WIN":PP$="$50"
730 Q$="YOU'RE":QQ$="BANKRUPT"
740 R$="YOU LOSE":RR$="$75"
750 S$="YOU GAIN":SS$="A TURN"
760 T$="YOU LOSE":TT$="$45"
770 U$="YOU'RE":UU$="BANKRUPT"
780 V$="YOU WIN":VV$="$110"
790 W$="YOU LOSE":WW$="$90"
800 X$="YOU WIN":XX$="$35"
810 Y$="YOU WIN":YY$="$125"
820 Z$="YOU LOSE":ZZ$="$65"
830 B=RND(161:C=RND(16I:D=RND(16
I:A=D+C-B:IF A<1 OR A>16 THEN 83
0
840 IF U=0 IHEN 1550
850 IF YY=0 THEN 1610
860 IF O=>1000 IHEN 1610
870 IF V=>1000 THEN 1550
880 IF A=1 IHEN W=0:X=0:Y=96:Z=4
0
890 IF A=2 IHEN W=96:X=0:Y=192:Z
=40
900 IF A=3 THEN W=I92:X=0:Y=288:
Z=40
910 IF A=4 IHEN W=288:X=0:Y=384:
Z=40
920 IF A=5 IHEN W=384:X=0:Y=480:
Z=40
930 IF A=6 IHEN W=543:X=0:Y=639:
Z=40
940 IF A=7 IHEN W=543:X=40:Y=639
:Z=80
950 IF A=8 THEN W=543:X=80:Y=639
:Z=120
960 IF A=9 THEN W=543:X=151:Y=63
9:Z=I91
970 IF A=10 THEN W=447:X=151:Y=5
43:Z=191
980 IF A=11 IHEN W=351:X=151:Y=4
47:Z=191
990 IF A=12 THEN W=255:X=I51:Y=3
51:Z=191
1000 IF A=I3 IHEN W=I59:X=I51:Y=
255:Z=191
1010 IF A=14 THEN W=0:X=151:Y=96
:Z=191
I020 IF A=I5 THEN W=0:X=1II:Y=96
:Z=T51
1030 IF A=16 THEN W=0:X=71:Y=96:
Z=1I1
1040 GOSU81150:HCOLOR3,3:HLINE(W
,X1-(Y,Z1,PSET,B:FORG=1TO1:HL1NE
(W+G,X+GI-(Y-G,Z-GI,PSET,B:NEXTG
:H=RND(4I:PLAY"T2550"+STR$(HI+"F
FFFF":HCOLOR0,0:HLINE(W,XI-(Y,ZI
,PSET,B:HCOLORI,1:FORG=1TO1:HL1H
E(W+G,X+GI-(Y-G,Z-GI,PSET,8:HEXT
G
1050 HPRINT(E,EEI,F$:HPRINT(E,EE
+II,FF$
1060 A$=INKEY$
1070 IF A$="B" AHD T=0 AND O>199
 THEN I=-200:II=I:A$="":SOUN075,
3:GOTO1090 ELSE IF A$="8" AND T=
1 AND V>199 THEN I=-200:11=1:A$=
"":SOUHD75,3:GOTO1090 ELSE 1080
T080 IF A$="" THEN 830 ELSE 1120
I090 HCOLOR0,0:HPRIHT(I4,6),Q:HP
RINT(19,7I,U:HPRINT(55,6I,V:HPRI
HT(60,7I,YY
I100 IF T=0 THEN O=0+I:U=U+II EL
SE IF T=1 THEH V=V+1:YY=YY+11
1110 HCOLOR3,3:HPRIHT(I4,6),Q:HP
RINT(19,7I,U:HPRINT(55,6I,V:HPRI
NT(60,7I,YY:GOTO830
I120 HCOLOR3,3:HPRINT(E,EEI,F$;H
PRINT(E,EE+II,FF$:FORF=1TO6:HCOL
OR3,3:HLINE(W+F,X+F)-(Y-F,Z-FI,P
SET,8:FORS=1TO255STEP60:SOUNDS,1
:HCOLOR0,0:NEXTS,F:HCOLOR1,1:FOR
F=6TO1STEP-I:HLINE(W+F,X+F)-(Y-F
,Z-FI,PSET,8:NEXTF:HCOLOR0,0:HLI
NE(W,X1-(Y,ZI,PSET,8
II30 HCOLORI,1:HPRINT(E,EEI,F$;H
PRINT(E,EE+II,FF$:HCOLOR3,3
1140 GOTO1320
1150 IF A=1 THEN E=3:EE=1:F$=K$:
FF$=KK$
1160 IF A=2 THEN E=14:EE=1:F$=L$
:FF$=LL$
1170 IF A=3 THEN E=26:EE=1:F$=M$
:FF$=MM$
1180 IF A=4 THEN E=38:EE=1:F$=N$
:FF$=NN$
1190 IF A=5 THEN E=50:EE=1:F$=O$
:FF$=OO$
1200 IF A=6 THEN E=70:EE=1:F$=P$
:FF$=PP$
1210 IF A=7 THEN E=70:EE=6:F$=O$
:FF$=QO$
1220 IF A=8 THEN E=70:EE=11:F$=R
$:FF$=RR$
1230 IF A=9 THEN E=70:EE=20:F$=S
$:FF$=SS$
1240 IF A=10 THEN E=58:EE=20:F$=
T$;FF$=TT$
1250 IF A=11 THEN E=46:EE=20:F$=
U$:FF$=UU$
1260 IF A=12 THEN E=34:EE=20:F$=
V$:FF$=VV$
I270 IF A=13 THEN E=22:EE=20:F$=
W$:FF$=WW$
1280 IF A=14 THEN E=2:EE=20:F$=X
$:FF$=XX$
1290 IF A=15 THEN E=2:EE=15:F$=Y
$:FF$=YY$
I300 IF A=16 THEN E=2:EE=I0:F$=Z
$:FF$=ZZ$
1310 HCOLOR3,3:HPRIN1(E,EEI,F$:H
PRIN1(E,EE+II,FF$:RETURN
1320 HCOLOR0,0:HPRINT(14,6I,O:HP
RINT(19,7I,U:HPRINT(55,6I,V:HPRI
NT(60,7I,YY
1330 I=0:II=0:IF A=1 THEN I=200
1340 IF A=2 IHEN I=-I50
1350 IF A=3 THEN II=1
1360 IF A=4 THEN I=225
I370 IF A=5 THEN II=-1
1380 IF A=6 THEN I=50
1390 IF A=7 THEN I=.2
1400 IF A=8 THEN I=-75
1410 IF A=9 THEN II=1
1420 IF A=10 THEN I=-45
1430 IF A=1I THEN I=.2
1440 IF A=12 THEN I=110
1450 IF A=13 IHEN I=-90
1460 IF A=14 IHEN I=35
1470 IF A=15 IHEN I=125
1480 IF A=16 IHEN I=-65
1490 IF T=0 ANO 11=-1 THEN U=U-1
:T=I:GOTOI520 ELSE IF T=I ANO II
=-1 THEN YY=YY-1:T=0:GOTO1520
1500 IF T=0 ANO I=.2 ANO O>0 IHE
N O=0:T=1:I=0:GOTO1520 ELSE IF T
=0 ANO I=.2 THEN T=1:I=0:GOTO152
0 ELSE IF T=1 AND I=.2 AND V>0 T
HEN V=0:T=0:1=0:GOTO1520 ELSE IF
 T=1 AND I=.2 THEN T=0:1=0:GOTO1
520
1510 IF T=0 THEN O=O+I:U=U+II EL
SE IF T=1 THEN V=V+1:YY=YY+11
I520 HCOLOR3,3:HPRINT(14,6I,O:HP
RINT(19,7I,U:HPRINT(55,6I,V:HPRI
NT(60,7I,YY
1530 IF T=0 THEN HCOLOR3,3:HPRIN
T(50,18I,"2>";HCOLORI,1:HPRINT(1
3,18),"1>";PLAY"T5004COFG" ELSE
IF T=1 THEN HCOLOR3,3:HPRINT(13,
18I,"1>":HCOLORI,1:HPRINT(50,18I
,"2>";PLAY"T5004COFG"
1540 GOTO830
1550 GOSU81670
I560 HCOLORI,1:HPRINT(12,8I,"CON
GRATULATIONS!"
I570 HPRINT(7,I0I,B$:HPRINT(21,1
0I,"YOU WON!!!!"
1580 W=0:X=0:Y=320:Z=192:S=10:FO
RF=1TO20:S=S+10:H=RNO(8I:HCOLORH
:HLINE(W+F,X+FI-(Y-F,Z-FI,PSET,8
:SOUNDS,1:NEXTF:FORF=20TOTSTEP-1
:S=S-10:H=RND(8I:HCOLORH:HLINE(W
+F,X+FI-(Y-F,Z-FI,PSET,B:SOUNDS,
I:NEXTF
1590 A$=INKEY$:IFA$=""THENI580 E
LSE 1600
I600 PLAY"T804A03A02A0IAOIA02A03
ATTO4A":END
I610 GOSU81670
1620 HCOLORI,1:HPRINT(12,8I,"CON
GRATULATIONS!"
I630 HPRINT(7.I0I,AA$:HPRINT(21,
10I,"YOU WONI!!I"
T640 W=0:X=0:Y=320:Z=192:S=10:FO
RF=1TO20:S=S+I0:H=RNO(81:HCOLORH
:HLINE(W+F,X+FI-(Y-F,Z-FI,PSET,8
:SOUNDS,T:NEXTF:FORF=20TO1STEP-1
:S=S-10:H=RND(8I:HCOLORH:HLINE(W
+F,X+FI-(Y-F,Z-FI,PSET,8:SOUNDS,
I:NEXTF
1650 A$=INKEY$:IFA$=""THENI640 E
LSE 1660
1660 PLAY"T804A03A02A01A01A02A03
ATI04A":END
1670 PALETTE0,0:PALETTE1,63:PALE
TTE2,36;PALETTE3.18:PALETTE4,1I:
PALETTE5,7:PALETTE6,31:PALETTE7,
9:PALETTE8,38:HSCREEN2:HCLS0:RET
URN
```

Feature Program

Gone Fishin'

Everyone who likes to fish has at some time had to tell of the one that got away. Thanks to the power of the CoCo 3 we can now see what's going on down there. This short program uses animation to take us below the surface, where we begin to understand the cunning nature of our adversary.

As an aid to beginners entering this program, I want to point out a few minor pitfalls. The program is designed for use with a television or composite color monitor. If you're using an RGB monitor, you'll have to change the PALETTE commands in lines 20 and 125 to get the right colors. Also, if the program starts with a blue background then fills with another color, you'll find the problem in the data statements (lines 190 through 225).

The next time someone asks you about the one that got away, you can show them how it happened.

Roger Severs joined the CoCo Community in 1982. He enjoys writing programs in BASIC and is currently learning 6809 assembly language and BASIC09. He may be contacted at HCR7, Box 218, Doniphan, MO 63935.

CoCo 3

The Listing: FISH1R

```
1 'FISH1N
2 'BY ROGER SEVERS
3 'COPYRIGHT (C) 1992
4 'BY FALSOFT, INC.
5 'RAINBOW MAGAZINE
10 ON BRK GOTO 380
20 HBUFF 1,363:HBUFF 2,380:HBUFF
 3,363:HBUFF 4,27:HBUFF 5,130
30 HSCREEN2:POKE65497,0
40 HCLS2:PALETTE 4,11:PALETTE 8,
11:PALETTE 6,11
50 FORX=1TO153
60 READ B
70 READ C
80 HSET(B,C,4)
90 NEXT X
100 HPAINT(15,121,4,4:HPAINT(303
,12),4,4
110 HSET(9,12,2):HSET(310,12,2)
120 HCIRCLE(10,121,8,2,1,.89,.14
:HCIRCLE(310,121,8,2,1,.36,.64
130 HLINE(5,141)-(7,14),PRESET:HL
INE(312,14)-(314,141,PRESET
140 FORQ=1TO9
150 READ D
160 READ E
170 HSET(D,E,8):HEXTD
180 FORR=1TO52
190 READ F
200 READ G
210 HSET(F,G,61:HEXTR
220 HPAINT(214,71,6,6
230 HGET(4,1)-(29,261,1:HGET(32,
11-158,271,2:HGET(290,11-(315,26
),3:HGET(99,41-(104,101,4
240 HGET(200,41-(218,161,5
250 HPUT(4,11-(29,261,2:HPUT(290
,1)-(315,26),2:HPUT(99,31-(125,2
91,2:HPUT(199,31-(225,291,2:PALE
TTE4,63:PALETTE 8,0:PALETTE 6,9
260 FORH=20 TO 300 STEP 10:HCIRC
LE(H,180),11,8,1,,04,,48:NEXTH
270 FORM=290 TO 1 STEP-6
280 HPUT(H,60)-(25+M,851,1:FORT=
1TO54:HEXTT:HPUT(M,601-(26+H,861
,2:NEXTM
290 FORN=2 TO 290 STEP 6
300 HPUT(N,851-(25+N,110),3:FORT
=1TO54:NEXTT:HPUT(H,851-(26+N,11
11,2:NEXTN
310 FORP=290 TO 186 STEP-2
320 HPUT(P,1001-(25+P,1251,1:HPU
T(177,290-P)-(182,296-P),4:HPUT(
177,290-P)-(182,296-P),2:HPUT(P,
1001-(25+P,1251,2:HSET(176,290-P
,81:NEXTP
330 HPUT(177,1051-(182,111),4:HP
UT(186,1001-(211,125),1:FORT=1TO
300:NEXTT:HPUT(186,100)-(212,126
1,2
340 HPUT(168,108)-(186,120),5
350 FORS=186 TO 290 STEP 2
360 HPUT(5,1301-(25+S,1551,3:FOR
T=1TO50:HEXTT:HPUT(S,1301-(26+S,
1561,2:NEXTS
370 HCLS2:GOTO260
380 POKE65496,0:END
390 DATA 5,13,6,12,7,11,8,10,9,9
,10,9,11,8,12,7,13,6,14,6,15,5,1
6,4,17,3,18,2,19,2,19,3,19,4,19,
5,19,6,19,7,19,8,19,9,19,10,20,1
0,21,10,22,10,23,10,24,9,25,8,26
,7,27,6,28,7,28,8,28,9,28,10,28,
11,28,12,28,13,28,14
400 DATA 28,15,28,16,28,17,28,18
,28,19,28,20,27,21,26,20,25,19,2
4,18,23,17,22,17,21,17,20,17,19,
17,19,18,19,19,19,20,19,21,19,22
,19,23,19,24,19,25,18,25,17,24,1
6,23,15,22,14,21,13,21,12,20,11,
19,10,18,9,18,8,17,7,16,6,15,5,1
4
410 DATA 314,13,313,12,312,11,31
1,10,310,9,309,9,308,8,307,7,306
,6,305,6,304,5,303,4,302,3,301,2
,300,2,300,3,300,4,300,5,300,6,3
00,7,300,8,300,9,300,10,299,10,2
98,10,297,10,296,10,295,9,294,8,
293,7,292,6,291,7,291,8
420 DATA 291,9,291,10,291,11,291
,12,291,13,291,14,291,15,291,16,
291,17,291,18,291,19,291,20,292,
21,293,20,294,19,295,18,296,17,2
97,17,298,17,299,17,300,17,300,1
8,300,19,300,20,300,21,300,22,30
0,23,300,24,300,25
430 DATA 301,25,302,24,303,23,30
4,22,305,21,306,21,307,20,308,19
,309,18,310,18,311,17,312,16,313
,15,314,14
440 DATA 100,5,100,6,100,7,100,8
,100,9,101,9,102,9,103,9,103,8,1
03,7
450 DATA 210,5,211,5,212,5,213,5
,214,5,215,5,216,5,217,5,217,6,2
17,7,217,8,217,9,217,10,217,11,2
17,12,217,13,217,14,217,15,216,1
5,215,15,214,15,213,15,213,14,21
3,13,212,13,211,14,210,15,209,15
,208,15,207,15,206,15
460 DATA 205,15,204,15,203,15,20
2,15,201,14,201,13,201,12,201,11
,202,10,203,9,204,9,205,9,206,9,
207,9,208,9,209,9,210,9,210,8,21
0,7,210,6,210,5
```


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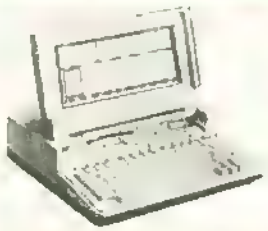

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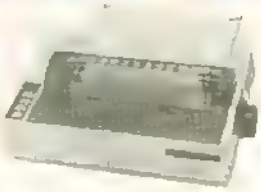

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